

FOREWORD

This report is the forty-second in the Agency's series of annual reports on operating experience with nuclear power stations in Member States.

As in previous years, in addition to annual performance data and outage information, the report contains a historical summary of performance and outages during the lifetime of individual plants and six figures illustrating worldwide performance and statistical data. Since 2006 the report is in an electronic version on CD-ROM which provides enhanced features for data searching and analysing.

It is hoped that this report and related Agency publications will be useful to everyone concerned with nuclear power reactors. Suggestions and corrections from readers would be most welcome.

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1. INTRODUCTION

This report is the forty-second in the Agency's series of annual reports on operating experience with nuclear power stations in Member States. For the sixth time it is issued purely in an electronic version.

The report is a direct output from the Agency's Power Reactor Information System (PRIS), whose databank contains all operating experience data published in the Agency's operating experience annual reports since 1970 and basic information on power reactors, including design data. It presents operating experience data for all worldwide nuclear power plants after starting commercial operation. The PRIS databank is available free of charge to IAEA Member States through its public website and on-line application PRIS-Statistics. The web-site www.iaea.org/pris contains publicly available information about reactor units and nuclear industry results. The PRIS-Statistics (<http://prisweb.iaea.org>) allows direct access to the database through the Internet. This application allows registered users report generation through pre-designed reports and filters.

Load, operation and availability factors are used as the basic performance indicators. Energy unavailability factors, separately for planned and unplanned unavailability (due either to causes under plant management control or external causes out of plant management control), are used as a measure of energy lost through a unit not being available. However, some ambiguity remains in the operators' reports of the unavailability data, resulting in inconsistencies in these factors. It is recognized that there is an inherent difficulty in reporting unavailability in energy due to external causes with relation to energy losses due to load following operation and grid limitation. It should be noted that, for load, operation and unavailability factors, there might be differences between the data of this report and those published elsewhere. To avoid confusion, reference should be made to the definitions given in Section 2. In Section 3 this report presents figures illustrating worldwide performance indicators up to 2010.

According to the information available to the Agency at the end of 2010, there were 441 nuclear power reactors operating in the world, with a total net capacity of 375.3 GW_(e). This was about 5 GW_(e) more than at the end of 2009 due to five new grid connections and only one final shutdown, Phenix in France.

While 2009 saw two new grid connections in 2010 five new reactors were connected to the grid: Lingao-3 (1000 MW_(e)) and Qinshan 2-3 (610 MW_(e)) in China; Rajasthan-6 (202 MW_(e)) in India; Shin-Kori-1 (960 MW_(e)) in the Republic of Korea and Rostov-2 (950 MW_(e)) in Russia.

For nuclear power, 2010 was another year in a row with a high number of construction starts on new reactors. There were sixteen construction starts: Angra-3 (1245 MW_(e)) in Brazil; Fangchenggang-1&2, Fuqing-3 Haiyang 2, Ningde-3&4, Yangjiang-3 (all 1000 MW_(e)), Changjiang 1&2 (610 MW_(e)), Taishan-2 (1700 MW_(e)),

in China; Kakrapar 3&4 (630 MW_(e)) in India; Ohma (1325 MW_(e)) in Japan and Leningrad 2-2 (1085 MW_(e)), Rostov-4 (1011 MW_(e)), in the Russian Federation. This compares with eleven construction starts in 2009 and ten in 2008. At the end of 2010 there were 67 nuclear power plants under construction in the world (the largest number since 1989) with a total net capacity 64.1 GW_(e).

Section 6 consists of information related to non-electrical application of nuclear power reactors. It provides production data related to district heating, industrial process heat delivery and to water desalination. In 2010 the nuclear energy was utilized for non-electrical application in 11 Member States involving energy from 75 nuclear reactors.

As the previous year the 2011 edition contains also detail design characteristics of reactor units and dashboards with a general overview of each individual operating nuclear power reactor.

This publication includes information received by the Agency up to 20 May 2011. Up to this date data from all operating units had been reported. Any data modification received after that date, although not included in this publication, is available in the PRIS database.

The information contained in the report was made available to the Agency through designated national correspondents. The Agency appreciates the valuable assistance of the national authorities, official correspondents and various electrical utilities in gathering the information for this report.

The report was compiled by staff of the Agency's Division of Nuclear Power. It is hoped that it will be useful to nuclear power plant operators, nuclear system designers, nuclear power planners, interested professional engineers and scientists and others concerned with the operating experience of nuclear power reactors. Suggestions and corrections from readers would be most welcome.

2. DEFINITIONS

1. Reference Unit Power, RUP [$MW_{(e)}$]

The reference unit power is the maximum (electrical) power that could be maintained continuously throughout a prolonged period of operation under reference ambient conditions.

It is specified that this value must remain constant for a given unit unless, following permanent modification, or a new permanent authorization, the management decides to amend the original value.

The reference unit power may be gross of net:

– The gross RUP (P_g , $MW_{(e)}$) is deemed to be measured at the output terminals of all generator sets in the station; it includes therefore the power taken by the station auxiliaries and losses in transformers that are considered integral parts of the station.

– The net RUP (P_n , $MW_{(e)}$), indicating the maximum power that can be supplied, is measured at the station outlet terminals, i.e. after deducting the power taken by station auxiliaries and the losses in the transformers that are considered integral parts of the station.

2. Design net capacity [$MW_{(e)}$]

The net reference unit power as specified in an original unit design.

3. Reference period, T [hours]

For units in power ascension at the end of the period, the clock hours from the beginning of the period or the first electrical production, whichever comes last, to the end of the period.

For units in commercial operation at the end of the period, the clock hours from the beginning of the period or of commercial operation, whichever comes last, to the end of the period or permanent shutdown, whichever comes first.

4. On-line hours, t [hours]

The total clock hours in the reference period during which the unit operated with breakers closed to the station bus.

5. Reference Energy Generation, REG [$MW_{(e)}h$]

Net electrical energy which would have been supplied to the grid if the unit were operated continuously at the reference unit power during the whole reference period.

6. Energy Generated (net), EG [$GW_{(e)}h$]

Net electrical energy produced during the reference period as measured at the unit outlet terminals, i.e. after deducting the electrical energy taken by unit auxiliaries and the losses in transformers that are considered integral parts of the unit. If this quantity is less than zero, zero is reported.

7. Load Factor, LF [%]

$$LF = \frac{EG}{REG} \times 100$$

EG = energy generated (net), [MW_(e)h]
REG = reference energy generation [MW_(e)h]

Load factor, for a given period, is the ratio of the energy, which the power unit has produced over that period, to the energy it would have produced at its reference power capacity over that period.

8. Operation factor, OF [%]

$$OF = \frac{t}{T} \times 100$$

t = number of hours on-line [h]
T = number of hours in the reference period [h]

Operation factor is the ratio of the number of hours the unit was on-line, to the total number of hours in the reference period, expressed as a percentage. It is a measure of the unit time availability on the grid and does not depend on the operating power level.

9. Available capacity, P [MW_(e)]

The available capacity at a given moment is the maximum net capacity at which the unit or station is able or is authorized to be operated at a continuous rating under the prevailing conditions assuming unlimited transmission facilities.

10. Energy loss, EL [MW_(e)h]

Energy loss is the energy which could have been produced during the reference period by the unavailable capacity; it is categorized into three types:

- PEL - planned energy loss
- UEL - unplanned energy loss
- XEL - energy loss due to causes external to the plant

UEL comprise shutdowns, unplanned load reductions or outage extensions.

11. Unavailability

The unit unavailability is defined as a status when the plant is not able to operate at its maximum capacity (reference power). This condition, which may be under or beyond plant management control, should only reflect lack of availability of the plant itself, regardless of energy demand, transmission grid condition or political situation in the country.

Unavailability is classified as planned if it is foreseen at least 4 weeks in advance, generally at the time when the annual overhaul programme is established, and if the beginning of the unavailability period can be largely controlled and deferred by management. Unavailability is classified as unplanned if not scheduled at least four weeks in advance. Power plant operation at lower than maximum capacity because of lower demand from the grid but available to operate at the maximum capacity, does not constitute unavailability, either planned or unplanned.

12. Energy Availability Factor, EAF [%]

$$EAF = \frac{REG - PEL - UEL - XEL}{REG} \times 100$$

The energy availability factor over a specified period, is the ratio of the energy that the available capacity could have produced during this period, to the energy that the reference unit power could have produced during the same period.

13. Energy Unavailability Factor, EUF [%]

$$EUF = \frac{EL}{REG} \times 100$$

The unavailability factor over a specified period is the ratio of the energy losses EL that have not been produced during this period due to the unavailable capacity, to the energy that the reference unit power could have produced during the same period.

The energy unavailability factor EUF over a specified period can be divided into:

PUF = planned unavailability factor

UUF = unplanned unavailability factor due to causes in the plant

XUF = unplanned unavailability factor due to causes external to the plant.

The unavailability factor can be expressed as: $EUF = 100 - EAF$

14. Unit capability factor, UCF [%]

$$UCF = \frac{REG - PEL - UEL}{REG} \times 100$$

Unit capability factor is defined as the ratio of the energy that the unit was capable to generate over a given time period considering only limitation under the plant management control, to the reference energy generation over the same time period, expressed as a percentage. Both of these energy generation terms are determined relative to reference ambient conditions.

15. Unplanned capability loss factor, UCL [%]

$$UCF = \frac{UEL}{REG} \times 100$$

Unplanned capability loss factor is defined as the ratio of the unplanned energy losses during a given period of time, to the reference energy generation, expressed as a percentage. Unplanned energy loss is energy that was not produced during the period because of unplanned shutdowns, outage extensions, or unplanned load reductions due to causes under plant management control. Causes of energy losses are considered to be unplanned if they are not scheduled at least four weeks in advance.

16. Construction start

Date when first major placing of concrete, usually for the base mat of the reactor building, is done.

17. First criticality

Date when the reactor is made critical for the first time.

18. Grid connection

Date when the plant is first connected to the electrical grid for supply of power.

19. Commercial operation

Date when the plant is handed over by the contractors to the owner and declared officially to be in commercial operation.

20. Permanent Shutdown

Date when the plant is officially declared shut down by the owner and taken out of operation permanently.

21. Long-term Shutdown

A unit is considered in the long-term shutdown status, if it has been shut down for an extended period (usually several years) without any firm recovery schedule at the beginning but there is the intention to re-start the unit eventually.

22. Outages

For the purpose of PRIS coding, the outage is defined as any status of a reactor unit, when its actual output power is lower than the reference unit power for a period of time. By this definition, the outage includes both power reduction and unit shutdown. The outage is considered significant, if the loss in the energy production corresponds to at least ten hours of continuous operation at the reference unit power or if it has been caused by an unplanned reactor scram (even if the unit had been shut down for less than 10 hours).

23. Outage duration [h]

The total clock hours of the outage measured from the beginning of the reference period or the outage, whichever comes last, to the end of the reference period or the outage, whichever comes first.

24. Factors refer to the plants which were in commercial operation during the whole of the reference period.

25. Cumulative factors are given for the plants which were in commercial operation during full calendar years.

26. A blank and three periods (...), if used in tables, denote information that is not applicable or not available, respectively.

27. Types of outages

The outage type is a three-character code. The third character is for unplanned outages only:

Code_1 description:

- (P) Planned outage due to causes under the plant management control
- (U) Unplanned outage due to causes under the plant management control
- (X) Outage due to causes beyond the plant management control ("external")

Code_2 description:

- (F) Full outage
- (P) Partial outage

Code_3 description:

- (1) Controlled shutdown or load reduction that could be deferred but had to be performed earlier than four weeks after the cause occurred or before the next refueling outage, whatever comes first
- (2) Controlled shutdown or load reduction that had to be performed in the next 24 hours after the cause occurred
- (3) Extension of planned outage
- (4) Reactor scram, automatic
- (5) Reactor scram, manual.

28. Main causes of outages

- (A) Plant equipment failure
- (B) Refuelling without a maintenance
- (C) Inspection, maintenance or repair combined with refuelling
- (D) Inspection, maintenance or repair without refuelling
- (E) Testing of plant systems or components
- (F) Major back-fitting, refurbishment or upgrading activities with refuelling
- (G) Major back-fitting, refurbishment or upgrading activities without refuelling
- (H) Nuclear regulatory requirements
- (J) Grid failure or grid unavailability
- (K) Load-following (frequency control, reserve shutdown due to reduced energy demand)
- (L) Human factor related
- (M) Governmental requirements or Court decisions
- (N) Environmental conditions (flood, storm, lightning, lack of cooling water due to dry weather, cooling water temperature limits etc.)
- (P) Fire
- (R) External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)
- (S) Fuel management limitation (including high flux tilt, stretch out or coast-down operation)
- (T) Heat supply (on-site to support next unit or desalination and off-site distribution)
- (U) Security and access control and other preventive shutdown due to external threats
- (Z) Others

29. Plant systems affected

Nuclear Systems

- 11.00 Reactor and Accessories
 - 11.01 Reactor vessel and main shielding (including penetrations and nozzles)
 - 11.02 Reactor core (including fuel assemblies)
 - 11.03 Reactor internals (including steam separators/dryers - BWR, graphite, pressure tubes)
 - 11.04 Auxiliary shielding and heat insulation
 - 11.05 Moderator and auxiliaries (PHWR)
 - 11.06 Annulus gas system (PHWR/RBMK)
 - 11.99 None of the above systems
- 12.00 Reactor I&C Systems
 - 12.01 Control and safety rods (including drives and special power supply)
 - 12.02 Neutron monitoring (in-core and ex-core)
 - 12.03 Reactor instrumentation (except neutron)
 - 12.04 Reactor control system
 - 12.05 Reactor protection system
 - 12.06 Process computer
 - 12.07 Reactor recirculation control (BWR)
 - 12.99 None of the above systems
- 13.00 Reactor Auxiliary Systems
 - 13.01 Primary coolant treatment and clean-up system

- 13.02 Chemical and volume control system
- 13.03 Residual heat removal system (including heat exchangers)
- 13.04 Component cooling system
- 13.05 Gaseous, liquid and solid radwaste treatment systems
- 13.06 Nuclear building ventilation and containment inerting system
- 13.07 Nuclear equipment venting and drainage system (including room floor drainage)
- 13.08 Borated or refuelling water storage system
- 13.09 CO₂ injection and storage system (GCR)
- 13.10 Sodium heating system (FBR)
- 13.11 Primary pump oil system (including RCP or make-up pump oil)
- 13.12 D₂O leakage collection and dryer system (PHWR)
- 13.13 Essential auxiliary systems (GCR)
- 13.99 None of the above systems

- 14.00 Safety Systems
- 14.01 Emergency core cooling systems (including accumulators and core spray system)
- 14.02 High pressure safety injection and emergency poisoning system
- 14.03 Auxiliary and emergency feedwater system
- 14.04 Containment spray system (active)
- 14.05 Containment pressure suppression system (passive)
- 14.06 Containment isolation system (isolation valves, doors, locks and penetrations)
- 14.07 Containment structures
- 14.08 Fire protection system
- 14.99 None of the above systems

- 15.00 Reactor Cooling Systems
- 15.01 Reactor coolant pumps/blowers and drives
- 15.02 Reactor coolant piping (including associated valves)
- 15.03 Reactor coolant safety and relief valves (including relief tank)
- 15.04 Reactor coolant pressure control system
- 15.05 Main steam piping and isolation valves (BWR)
- 15.99 None of the above systems

- 16.00 Steam generation systems
- 16.01 Steam generator (PWR), boiler (PHWR, AGR), steam drum vessel (RBMK, BWR)
- 16.02 Steam generator blowdown system
- 16.03 Steam drum level control system (RBMK, BWR)
- 16.99 None of the above systems

- 17.00 Safety I&C Systems (excluding reactor I&C)
- 17.01 Engineered safeguard feature actuation system
- 17.02 Fire detection system
- 17.03 Containment isolation function
- 17.04 Main steam/feedwater isolation function
- 17.05 Main steam pressure emergency control system (turbine bypass and steam dump valve control)
- 17.06 Failed fuel detection system (DN monitoring system for PHWR)

17.07 RCS integrity monitoring system (RBMK)

17.99 None of the above systems

Fuel and Refuelling Systems

21.00 Fuel Handling and Storage Facilities

21.01 On-power refuelling machine

21.02 Fuel transfer system

21.03 Storage facilities, including treatment plant and final loading and cask handling facilities

21.99 None of the above systems

Secondary plant systems

- 31.00 Turbine and auxiliaries
 - 31.01 Turbine
 - 31.02 Moisture separator and reheater
 - 31.03 Turbine control valves and stop valves
 - 31.04 Main condenser (including vacuum system)
 - 31.05 Turbine by-pass valves
 - 31.06 Turbine auxiliaries (lubricating oil, gland steam, steam extraction)
 - 31.07 Turbine control and protection system
 - 31.99 None of the above systems
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- 32.00 Feedwater and Main Steam System
 - 32.01 Main steam piping and valves
 - 32.02 Main steam safety and relief valves
 - 32.03 Feedwater system (including feedwater tank, piping, pumps and heaters)
 - 32.04 Condensate system (including condensate pumps, piping and heaters)
 - 32.05 Condensate treatment system
 - 32.99 None of the above systems
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- 33.00 Circulating Water System
 - 33.01 Circulating water system (pumps and piping/ducts excluding heat sink system)
 - 33.02 Cooling towers / heat sink system
 - 33.03 Emergency ultimate heat sink system
 - 33.99 None of the above systems
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- 34.00 Miscellaneous Systems
 - 34.01 Compressed air (essential and non-essential / high-pressure and low-pressure)
 - 34.02 Gas storage, supply and cleanup systems (nitrogen, hydrogen, carbon dioxide etc.)
 - 34.03 Service water / process water supply system (including water treatment)
 - 34.04 Demineralized water supply system (including water treatment)
 - 34.05 Auxiliary steam supply system (including boilers and pressure control equipment)
 - 34.06 Non-nuclear area ventilation (including main control room)
 - 34.07 Chilled water supply system
 - 34.08 Chemical additive injection and makeup systems
 - 34.09 Non-nuclear equipment venting and drainage system
 - 34.10 Communication system
 - 34.99 None of the above systems
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- 35.00 All other I&C Systems
 - 35.01 Plant process monitoring systems (excluding process computer)
 - 35.02 Leak monitoring systems
 - 35.03 Alarm annunciation system
 - 35.04 Plant radiation monitoring system
 - 35.05 Plant process control systems
 - 35.99 None of the above systems

Electrical Systems

- 41.00 Main Generator Systems
 - 41.01 Generator and exciter (including generator output breaker)
 - 41.02 Sealing oil system
 - 41.03 Rotor cooling gas system
 - 41.04 Stator cooling water system
 - 41.05 Main generator control and protection system
 - 41.99 None of the above systems

- 42.00 Electrical Power Supply Systems
 - 42.01 Main transformers
 - 42.02 Unit self-consumption transformers (station, auxiliary, house reserve etc.)
 - 42.03 Vital AC and DC plant power supply systems (medium and low voltage)
 - 42.04 Non-vital AC plant power supply system (medium and low voltage)
 - 42.05 Emergency power generation system (e.g. emergency diesel generator and auxiliaries)
 - 42.06 Power supply system logics (including load shed logic, emergency bus transfer logic, load sequencer logic, breaker trip logic etc.)
 - 42.07 Plant switchyard equipment
 - 42.99 None of the above systems

Note: Detail definitions of performance indicators and PRIS related terms can be found in the IAEA - Technical Reports Series No. 428: "The Power Reactor Information System (PRIS) and its Extension to Non-electrical Applications, Decommissioning and Delayed Projects Information", IAEA, Vienna (2005)

3. ABBREVIATIONS

COUNTRY CODES

AM	ARMENIA
AR	ARGENTINA
BE	BELGIUM
BG	BULGARIA
BR	BRAZIL
CA	CANADA
CH	SWITZERLAND
CN	CHINA
CZ	CZECH REPUBLIC
DE	GERMANY
ES	SPAIN
FI	FINLAND
FR	FRANCE
GB	UNITED KINGDOM
HU	HUNGARY
IN	INDIA
JP	JAPAN
KR	KOREA, REPUBLIC OF
KZ	KAZAKHSTAN
LT	LITHUANIA, REPUBLIC OF
MX	MEXICO
NL	NETHERLANDS
PK	PAKISTAN
RO	ROMANIA
RU	RUSSIAN FEDERATION
SE	SWEDEN
SI	SLOVENIA
SK	SLOVAK REPUBLIC
TW	TAIWAN, CHINA
UA	UKRAINE
US	UNITED STATES OF AMERICA
ZA	SOUTH AFRICA

REACTOR TYPES

BWR	Boiling Light-Water-Cooled and Moderated Reactor
FBR	Fast Breeder Reactor
GCR	Gas-Cooled, Graphite-Moderated Reactor
LWGR	Light-Water-Cooled, Graphite-Moderated Reactor
PHWR	Pressurized Heavy-Water-Moderated and Cooled Reactor
PWR	Pressurized Light-Water-Moderated and Cooled Reactor

OPERATORS

AEP	AMERICAN ELECTRIC POWER COMPANY, INC.
AmerenUE	AMEREN UE, UNION ELECTRIC COMPANY
ANAV	ASOCIACION NUCLEAR ASCO-VANDELLOS A.I.E.
ANPPJSC	JOINT STOCK COMPANY ARMENIAN NPP
APS	ARIZONA PUBLIC SERVICE CO.
Axpo AG	KERNKRAFTWERK BEZNAU
BE	BRITISH ENERGY
BKW	BKW ENERGIE AG
BRUCEPOW	BRUCE POWER
CEZ	CZECH POWER COMPANY , CEZ A.S.
CFE	COMISION FEDERAL DE ELECTRICIDAD
CHUBU	CHUBU ELECTRIC POWER CO.,INC
CHUGOKU	THE CHUGOKU ELECTRIC POWER CO.,INC.
CNAT	CENTRALES NUCLEARES ALMARAZ-TRILLO
CONSTELL	CONSTELLATION ENERGY NUCLEAR GROUP, LLC
DOMINION	DOMINION GENERATION
DTEDISON	DETROIT EDISON CO.
DUKEENER	DUKE ENERGY CORP.
E.ON	E.ON KERNKRAFT GMBH
EDF	ELECTRICITE DE FRANCE
ELECTRAB	ELECTRABEL M. V. NUCLEAIRE PRODUKTIE
ELETRONU	ELETRONUCLEAR S.A.
ENERGYNW	ENERGY NORTHWEST
EnKK	ENBW KERNKRAFT GMBH(SITZ IN OBRIGHEIM)
ENTERGY	ENTERGY NUCLEAR OPERATIONS, INC.
EPZ	N.V. ELEKTRICITEITS-PRODUKTIEMAATSCHAPPIJ ZUID-NEDERLAND
ESKOM	ESKOM
EXELON	EXELON GENERATION CO., LLC
FENOC	FIRST ENERGY NUCLEAR OPERATING CO.
FKA	FORSMARK KRAFTGRUPP AB
FORTUMPH	FORTUM POWER AND HEAT OY (FORMER IVO)
FPL	FLORIDA POWER & LIGHT CO.
GNPJVC	GUANDONG NUCLEAR POWER JOINT VENTURE COMPANY
HEPCO	HOKKAIDO ELECTRIC POWER CO.,INC.
HOKURIKU	HOKURIKU ELECTRIC POWER CO.
HQ	HYDRO QUEBEC
ID	IBERDROLA, S.A.
JAPCO	JAPAN ATOMIC POWER CO.
JNPC	JIANGSU NUCLEAR POWER CORPORATION
KEPCO	KANSAI ELECTRIC POWER CO.
KGK	KERNKRAFTWERK GUNDREMMINGEN GMBH
KHNP	KOREA HYDRO AND NUCLEAR POWER CO.
KKB	KERNKRAFTWERK BRUNSBÜTTEL GMBH
KKG	KERNKRAFTWERK GOESGEN-DAENIKEN AG
KKK	KERNKRAFTWERK KRÜMMEL GMBH & CO. OHG
KKL	KERNKRAFTWERK LEIBSTADT
KLE	KERNKRAFTWERKE LIPPE-EMS GMBH
KOZNPP	KOZLODUY NPP-PLC
KWG	GEMEINSCHAFTSKERNKRAFTWERK GROHNDE GMBH & CO.
KYUSHU	KYUSHU ELECTRIC POWER CO.,INC.
LANPC	LINGAO NUCLEAR POWER COMPANY LTD.
LDNPC	LINGDONG NUCLEAR POWER COMPANY LTD.

LUMINANT	LUMINANT GENERATION COMPANY LLC
MEL	MAGNOX ELECTRIC LIMITED
NASA	NUCLEOELECTRICA ARGENTINA S.A.
NBEPCC	NEW BRUNSWICK ELECTRIC POWER COMMISSION
NEK	NUKLERANA ELEKTRARNA KRŠKO
NEXTERA	NEXTERA ENERGY RESOURCES, LLC
NNEGC	NATIONAL NUCLEAR ENERGY GENERATING COMPANY
NPCIL	NUCLEAR POWER CORPORATION OF INDIA LTD.
NPQJVC	NUCLEAR POWER PLANT QINSHAN JOINT VENTURE COMPANY
NSP	NORTHERN STATES POWER CO.
NUCLENOR	NUCLENOR, S.A.
OKG	OKG AKTIEBOLAG
OPG	ONTARIO POWER GENERATION
OPPD	OMAHA PUBLIC POWER DISTRICT
PAEC	PAKISTAN ATOMIC ENERGY COMMISSION
PAKS Zrt	PAKS NUCLEAR POWER PLANT LTD
PG&E	PACIFIC GAS AND ELECTRIC COMPANY
PPL_SUSQ	PPL SUSQUEHANNA, LLC
PROGRESS	PROGRESS ENERGY
PSEG	PSEG NUCLEAR LLC PUBLIC SERVICE ELECTRIC & GAS CO.
QNPC	QINSHAN NUCLEAR POWER COMPANY
RAB	RINGHALS AB
REA	JOINT STOCK COMPANY CONCERN ROSENERGOATOM
RWE	RWE POWER AG
SCE	SOUTHERN CALIFORNIA EDISON CO.
SCE&G	SOUTH CAROLINA ELECTRIC & GAS CO.
SE,plc	SLOVENSKE ELEKTRARNE, A.S.
SHIKOKU	SHIKOKU ELECTRIC POWER CO.,INC
SNN	SOCIETATEA NATIONALA NUCLEARELECTRICA S.A.
SOUTHERN	SOUTHERN NUCLEAR OPERATING COMPANY, INC.
STP	STP NUCLEAR OPERATING CO.
TEPCO	TOKYO ELECTRIC POWER CO.,INC.
TOHOKU	TOHOKU ELECTRIC POWER CO.,INC
TPC	TAI POWER CO.
TQNPC	THE THIRD QINSHAN JOINTED VENTURE COMPANY LTDA.
TVA	TENNESSEE VALLEY AUTHORITY
TVO	TEOLLISUUDEN VOIMA OY
WCNOC	WOLF CREEK NUCLEAR OPERATION CORP.

CONTRACTORS

ABBATOM	ABBATOM (FORMERLY ASEA-ATOM)
ACECOWEN	ACECOWEN (ACEC-COCKERILL-WESTINGHOUSE)
ACLF	(ACECOWEN - CREUSOT LOIRE - FRAMATOME)
AECL	ATOMIC ENERGY OF CANADA LTD.
AECL/DAE	ATOMIC ENERGY OF CANADA LTDA AND DEPARTMENT OF ATOMIC ENERGY(INDIA)
AECL/DHI	ATOMIC ENERGY OF CANADA LTD./DOOSAN HEAVY INDUSTRY & CONSTRUCTION
AEE	ATOMENERGOEXPORT
APC	ATOMIC POWER CONSTRUCTION LTD.
ASEASTAL	ASEA-ATOM / STAL-LAVAL
B&W	BABCOCK & WILCOX CO.
CE	COMBUSTION ENGINEERING CO.
CGE	CANADIAN GENERAL ELECTRIC
CNNC	CHINA NATIONAL NUCLEAR CORPORATION
DFEC	DONGFANG ELECTRIC CORPORATION
DHICKAEC	DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA ATOMIC ENERGY
DHICKOPC	DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING CO.
EE/B&W/T	THE ENGLISH ELECTRIC CO. LTD / BABCOCK & WILCOX CO. / TAYLOR WOODROW CONSTR.
FAEA	FEDERAL ATOMIC ENERGY AGENCY
FRAM	FRAMATOME
FRAMACEC	FRAMACECO (FRAMATOME-ACEC-COCKERILL)
GE	GENERAL ELECTRIC CO.
GE/GETSC	GENERAL ELECTRIC CO. / GENERAL ELECTRIC TECHNICAL SERVICES CO.
GE/T	GENERAL ELECTRIC CO. / TOSHIBA CORPORATION
GETSCO	GENERAL ELECTRIC TECHNICAL SERVICES CO.
HITACHI	HITACHI LTD.
IZ	IZHORSKIYE ZAVODY
KWU	SIEMENS KRAFTWERK UNION AG
MHI	MITSUBISHI HEAVY INDUSTRIES LTD.
NEI.P	NEI PARSONS
NNC	NATIONAL NUCLEAR CORPORATION
NPC	NUCLEAR POWER CO. LTD.
NPCIL	NUCLEAR POWER CORPORATION OF INDIA LTD.
OH/AECL	ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.
PAA	PRODUCTION AMALGAMATION 'ATOMMASH', VOLGODONSK
PAIP	PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH, VOLGODONSK
PPC	PWR POWER PROJECTS LTD.
ROSATOM	STATE ATOMIC ENERGY CORPORATION ROSATOM
S/KWU	SIEMENS/KRAFTWERK UNION AG
SIEMENS	SIEMENS AG, POWER GENERATION –FRG
SKODA	SKODA CONCERN NUCLEAR POWER PLANT WORKS
TNPG	THE NUCLEAR POWER GROUP LTD.
TOSHIBA	TOSHIBA CORPORATION
WH	WESTINGHOUSE ELECTRIC CORPORATION
WH/MHI	WESTINGHOUSE ELECTRIC CORPORATION / MITSUBISHI HEAVY INDUSTRIES LTD.

4. FIGURES

1. Nuclear Power Reactors Operating Experience Years
2. Lifetime Energy Availability Factors up to 2010
3. Reactors with High Availability Factors for years 1981-2010
4. Average Energy Availability Factors for years 1990-2010
5. Number of Reactors in Operation (as of 31 December 2010)
6. Number of Reactors by Age (as of 31 December 2010)

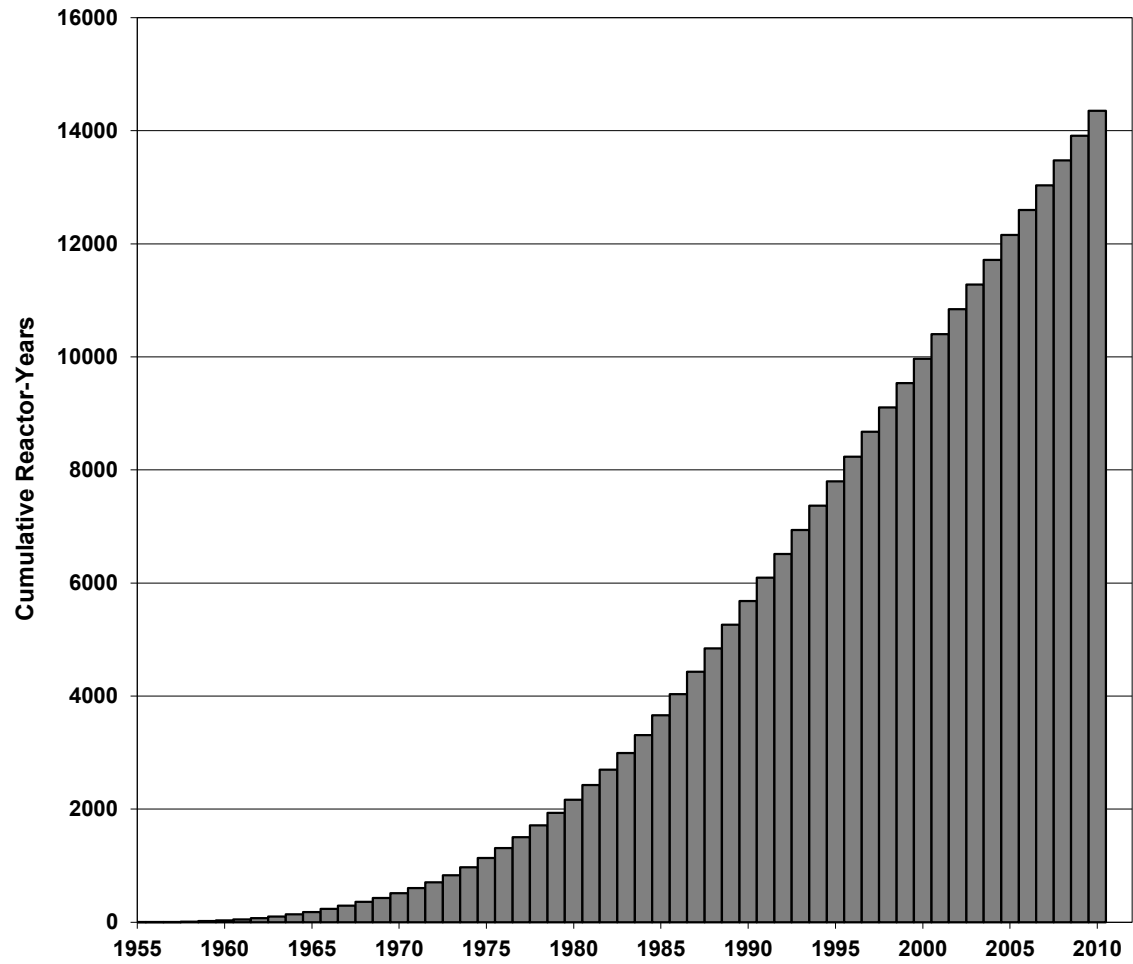


Figure 1 — Nuclear Power Reactors Operating Experience Years

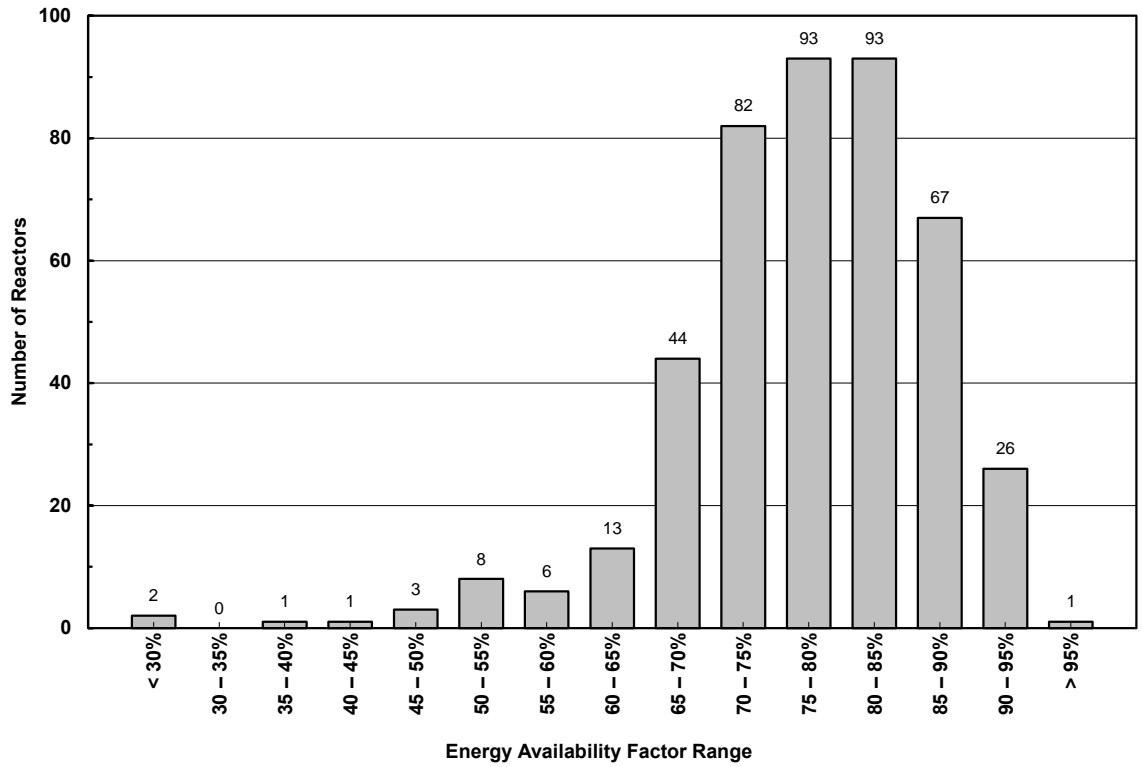


Figure 2 — Lifetime Energy Availability Factors up to 2010

(only reactors with capacity greater than 100 MW(e) and with more than one year of commercial operation)

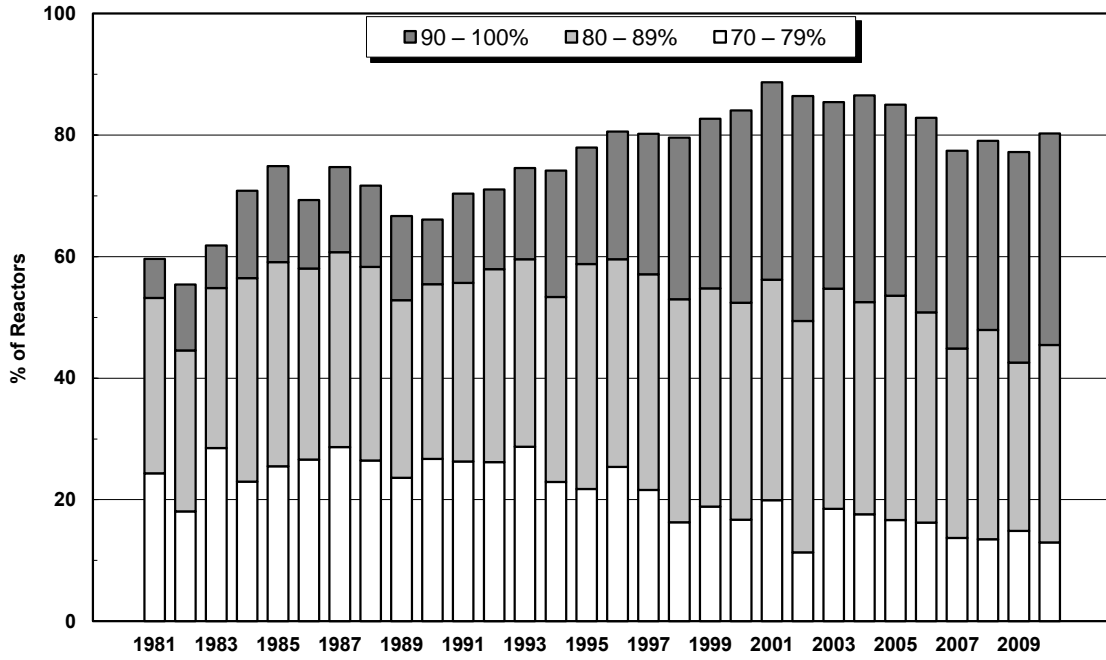


Figure 3 — Reactors with High Availability Factors

(only reactors with capacity greater than 100 MW(e) and with more than one year of commercial operation)

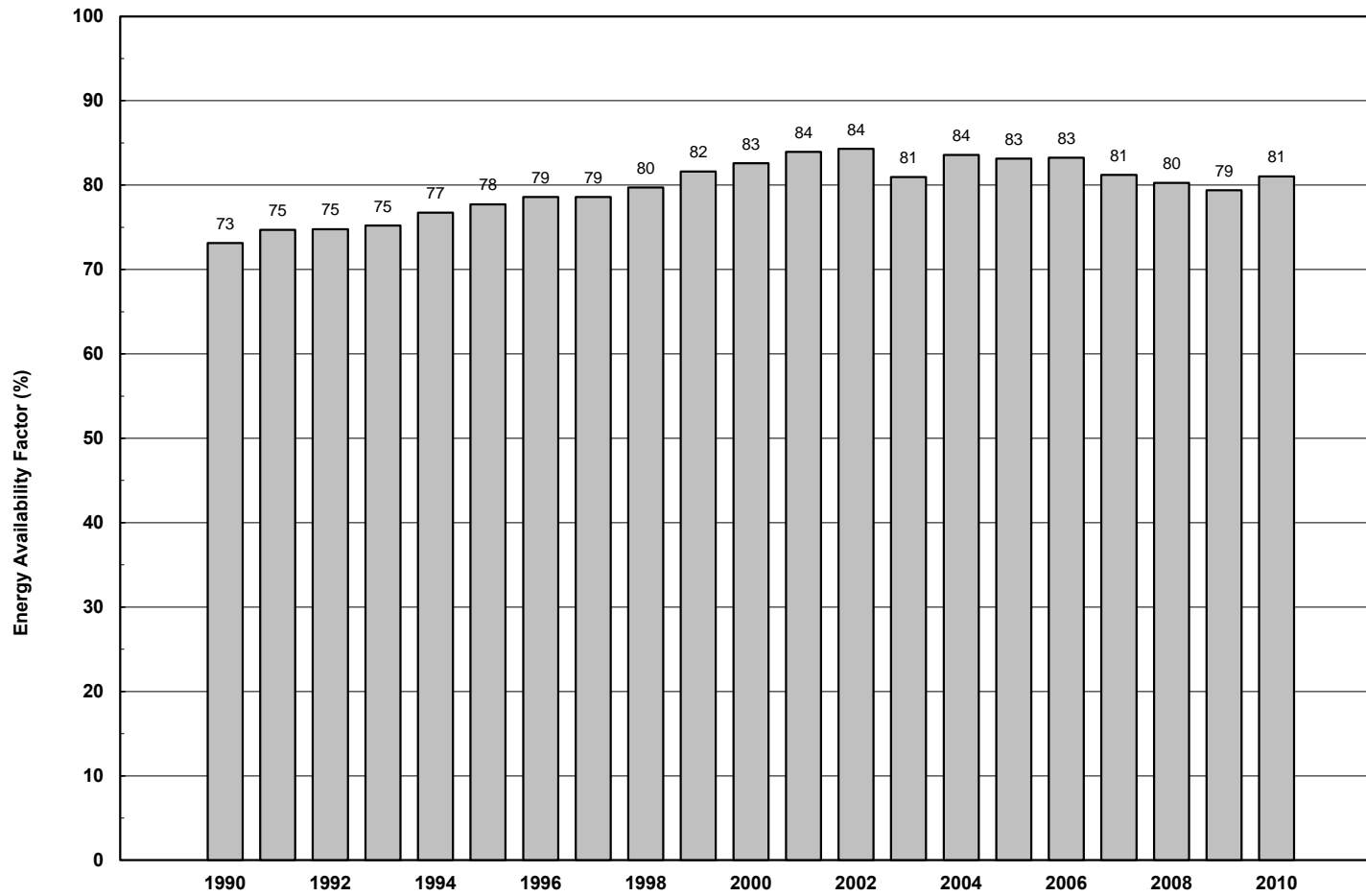


Figure 4 — Average Energy Availability Factors
(only reactors with capacity greater than 100 MW(e) and with more than one year of commercial operation)

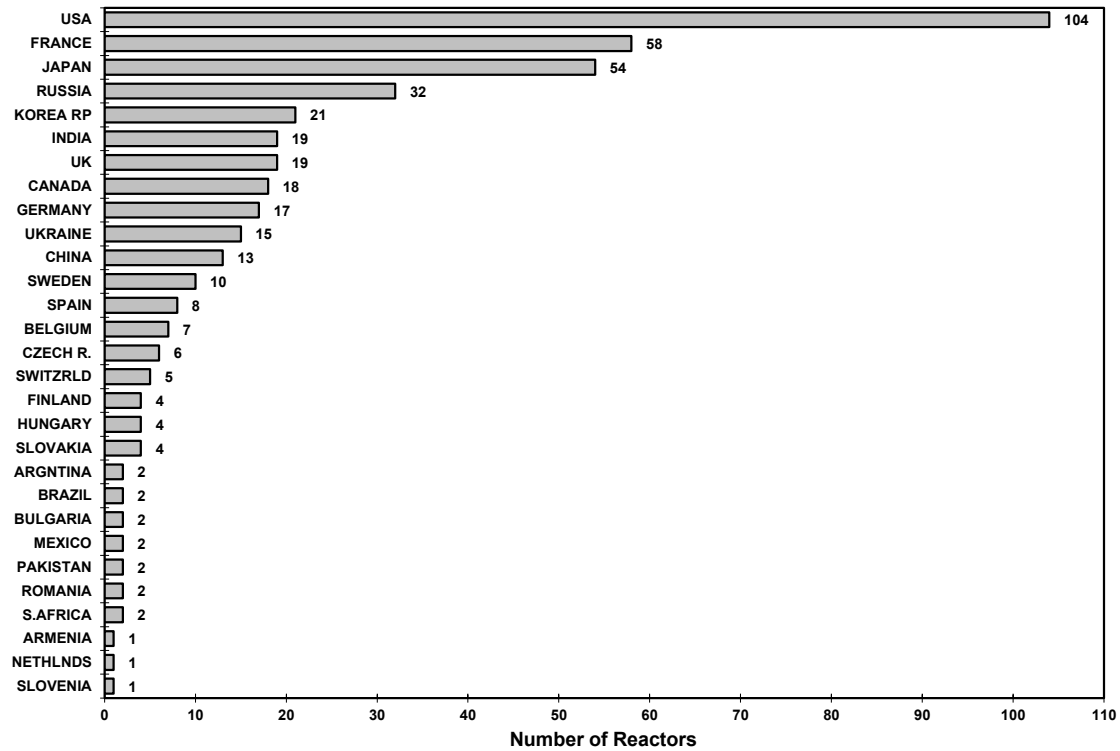


Figure 5 — Number of Reactors in Operation (as of 31 December 2010)

Note: There were 6 reactors in operation in Taiwan, China.

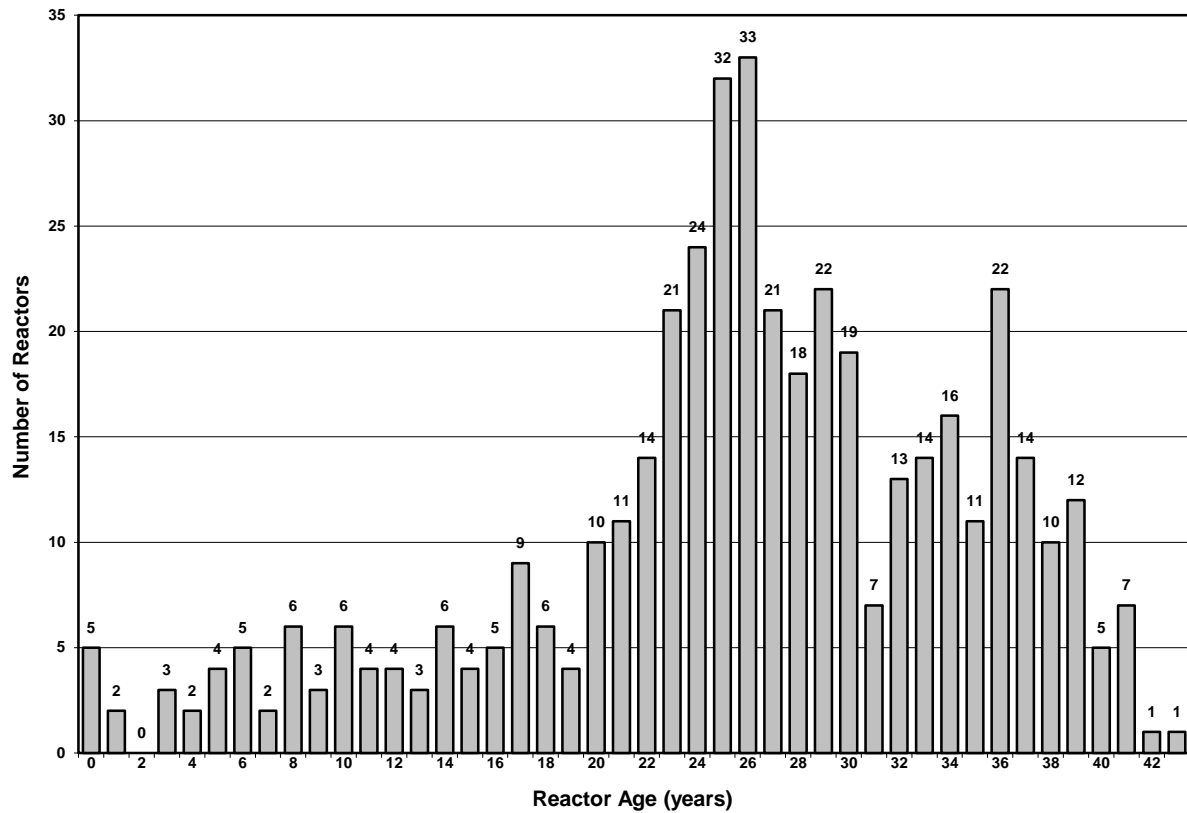


Figure 6 — Number of Reactors by Age (as of 31 December 2010)

5. OPERATING DATA SHEETS ON INDIVIDUAL NUCLEAR POWER STATIONS UNITS

<u>COUNTRY</u>	<u>NUMBER OF REACTORS</u>
ARGENTINA	2
ARMENIA	1
BELGIUM	7
BRAZIL	2
BULGARIA	2
CANADA	18
CHINA	19
MAINLAND	13
TAIWAN, CHINA	6
CZECH REPUBLIC	6
FINLAND	4
FRANCE	59
GERMANY	17
HUNGARY	4
INDIA	19
JAPAN	54
KOREA, REPUBLIC OF	21
MEXICO	2
NETHERLANDS	1
PAKISTAN	2
ROMANIA	2
RUSSIAN FEDERATION	32
SLOVAK REPUBLIC	4
SLOVENIA	1
SOUTH AFRICA	2
SPAIN	8
SWEDEN	10
SWITZERLAND	5
UKRAINE	15
UNITED KINGDOM	19
UNITED STATES OF AMERICA	104

AR-1 ATUCHA-1

Operator: NASA (NUCLEOELECTRICA ARGENTINA S.A.)
Contractor: SIEMENS (Siemens AG, Power Generation -FRG)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 335.0 MW(e)
Design Net Capacity: 319.0 MW(e)
Design Discharge Burnup: 11140 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2782.7 GW(e).h
Energy Availability Factor: 95.5%
Load Factor: 94.8%
Operating Factor: 97.7%
Energy Unavailability Factor: 4.5%
Total Off-line Time: 200 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	238.1	217.4	241.4	217.5	247.5	237.9	245.8	240.3	208.4	237.8	233.3	217.2	2782.7
EAF (%)	98.0	98.8	98.4	90.5	99.1	98.3	98.4	96.2	86.2	95.6	97.6	88.9	95.5
UCF (%)	98.0	98.8	98.4	90.5	99.1	98.4	98.4	96.2	86.3	95.6	97.6	88.9	95.5
LF (%)	95.5	96.6	96.9	90.2	99.3	98.7	98.6	96.4	86.4	95.4	96.7		94.8
OF (%)	100.0	100.0	100.0	93.3	100.0	100.0	100.0	97.2	89.7	99.7	100.0	92.6	97.7
EUF (%)	2.0	1.2	1.6	9.5	0.9	1.7	1.6	3.8	13.8	4.4	2.4	11.1	4.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	2.0	1.2	1.6	9.5	0.9	1.7	1.6	3.8	13.8	4.4	2.4	11.1	4.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1968
Date of First Criticality: 13/01/1974
Date of Grid Connection: 19/03/1974
Date of Commercial Operation: 24/06/1974

Lifetime Generation: 75141.9 GW(e).h
Cumulative Energy Availability Factor: 72.6%
Cumulative Load Factor: 70.1%
Cumulative Unit Capability Factor: 73.8%
Cumulative Energy Unavailability Factor: 27.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	831.3	321	51.5	51.5	50.7	50.7	50.7	50.7	3592	69.9
1975	2357.8	319	85.6	73.0	85.6	72.7	84.4	71.9	7730	88.2
1976	2408.6	319	86.9	78.4	86.9	78.2	86.0	77.4	7808	88.9
1977	1537.0	336	53.0	71.0	53.0	70.9	52.1	70.1	4650	53.1
1978	2711.8	345	90.9	75.6	90.9	75.5	89.7	74.6	8026	91.6
1979	2503.7	335	84.1	77.1	84.1	77.1	85.3	76.5	7551	86.2
1980	2180.5	335	73.5	76.6	73.5	76.5	74.1	76.2	6947	79.1
1981	2647.6	335	89.7	78.3	89.7	78.3	90.2	78.0	8120	92.7
1982	1753.6	335	59.2	76.1	59.2	76.0	59.8	75.9	5600	63.9
1983	2356.0	335	78.4	76.3	78.4	76.3	80.3	76.3	8101	92.5
1984	1706.1	335	98.7	78.4	98.7	78.4	58.0	74.6	8678	98.8
1985	1470.5	335	91.6	79.6	91.6	79.6	50.1	72.5	7159	81.7
1986	2205.0	335	75.8	79.3	75.8	79.3	75.1	72.7	7532	86.0
1987	1405.8	335	49.2	77.1	49.2	77.0	47.9	70.8	4391	50.1
1988	808.1	335	27.1	73.6	27.1	73.6	27.5	67.8	2515	28.6
1989	0.0	335	0.0	68.9	0.0	68.8	0.0	63.5	0	0.0
1990	1722.6	335	84.9	69.8	84.9	68.2	58.7	63.2	7201	82.2
1991	2721.9	335	92.6	71.1	92.6	69.6	92.8	64.9	8390	95.8
1992	2230.2	335	76.3	71.4	76.3	70.0	75.8	65.5	7089	80.7
1993	2403.7	335	82.2	72.0	82.2	70.6	81.9	66.3	7287	83.2
1994	2651.9	335	90.4	72.9	90.4	71.6	90.4	67.5	7916	90.4
1995	2671.7	335	92.3	73.8	92.3	72.5	91.0	68.6	8376	95.6
1996	2038.8	335	70.6	73.6	70.6	72.4	69.3	68.6	6990	79.6
1997	2720.1	335	93.4	74.5	93.4	73.3	92.7	69.6	8329	95.1
1998	2374.4	335	81.4	74.7	81.3	73.7	80.9	70.1	7242	82.7
1999	1395.5	335	47.8	73.7	47.8	72.6	47.6	69.2	4364	49.8
2000	1677.9	335	72.8	73.7	56.8	72.0	57.0	68.7	5038	57.4
2001	1426.0	335	48.7	72.8	48.7	71.2	48.6	68.0	4407	50.3
2002	1011.5	335	34.6	71.4	34.6	69.9	34.5	66.8	3030	34.6
2003	2020.6	335	68.8	71.3	68.8	69.9	68.9	66.9	6094	69.6
2004	2725.0	335	92.2	72.0	92.2	70.6	92.6	67.7	8250	93.9
2005	1998.0	335	68.5	71.9	68.5	70.5	68.1	67.8	7004	80.0
2006	2100.5	335	72.1	71.9	72.1	70.6	71.6	67.9	6403	73.1
2007	2718.7	335	94.0	72.6	93.8	71.3	92.6	68.6	8300	94.7
2008	2481.3	335	85.3	72.9	85.3	71.7	84.3	69.1	7562	86.1
2009	2397.2	335	82.9	73.2	82.9	72.0	81.7	69.4	7296	83.3
2010	2782.7	335	95.5	73.8	95.5	72.6	94.8	70.1	8560	97.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		95			739	1
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling				36		
D. Inspection, maintenance or repair without refuelling				1116		
E. Testing of plant systems or components				11		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				38		
H. Nuclear regulatory requirements		105			39	37
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					13	46
Subtotal	0	200	0	1201	802	86
Total		200			2089	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	48	113
12. Reactor I&C Systems		48
13. Reactor Auxiliary Systems		160
14. Safety Systems		36
15. Reactor Cooling Systems	47	182
16. Steam generation systems		57
17. Safety I&C Systems (excluding reactor I&C)		11
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		23
33. Circulating Water System		8
41. Main Generator Systems		5
42. Electrical Power Supply Systems		63
Total	95	716

AR-2 EMBALSE

Operator: NASA (NUCLEOELECTRICA ARGENTINA S.A.)
 Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 600.0 MW(e)
 Design Net Capacity: 600.0 MW(e)
 Design Discharge Burnup: 7190 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3908.7 GW(e).h
 Energy Availability Factor: 74.4%
 Load Factor: 74.4%
 Operating Factor: 76.5%
 Energy Unavailability Factor: 25.6%
 Total Off-line Time: 2059 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	440.3	396.3	366.3	0.0	126.6	310.8	440.9	439.9	425.1	438.0	423.3	101.3	3908.7
EAF (%)	98.6	98.3	82.1	0.0	28.4	71.9	98.8	98.6	98.4	98.1	98.0	22.7	74.4
UCF (%)	98.6	98.3	82.1	0.0	28.4	78.0	98.8	98.6	98.4	98.1	98.0	22.7	74.9
LF (%)	98.6	98.3	82.1	0.0	28.4	71.9	98.8	98.6	98.4	98.1	98.0	22.7	74.4
OF (%)	100.0	100.0	83.9	0.0	29.8	82.4	100.0	100.0	100.0	100.0	100.0	23.4	76.5
EUf (%)	1.4	1.7	17.9	100.0	71.6	28.1	1.2	1.4	1.6	1.9	2.0	77.3	25.6
PUF (%)	1.4	1.7	17.3	100.0	36.3	0.0	1.2	1.4	1.5	1.9	2.0	77.3	20.3
UCLF (%)	0.0	0.0	0.6	0.0	35.4	22.0	0.0	0.0	0.1	0.0	0.0	0.0	4.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

INCONSISTENCY IS DUE TO LOAD REDUCTION IN DIFERENT PERIODS.

5. Historical Summary

Date of Construction Start: 04 Jan 1974 Lifetime Generation: 121179.0 GW(e).h
 Date of First Criticality: 13/03/1983 Cumulative Energy Availability Factor: 86.7%
 Date of Grid Connection: 25/04/1983 Cumulative Load Factor: 84.5%
 Date of Commercial Operation: 20/01/1984 Cumulative Unit Capability Factor: 87.1%
 Cumulative Energy Unavailability Factor: 13.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	2527.1	600	70.3	70.3	69.9	69.9	47.9	47.9	6355	72.3
1985	3778.6	600	93.4	81.9	93.4	81.6	71.9	59.9	8170	93.3
1986	3061.7	600	67.1	77.0	66.3	76.5	58.3	59.4	5847	66.7
1987	4577.0	600	87.9	79.7	87.9	79.4	87.1	66.3	7951	90.8
1988	4560.6	600	88.8	81.5	88.8	81.3	86.5	70.3	7798	88.8
1989	4659.0	600	90.1	82.9	89.1	82.6	88.6	73.4	7804	89.1
1990	5000.7	600	96.5	84.9	95.1	84.4	95.1	76.5	8404	95.9
1991	4498.8	600	89.7	85.5	85.8	84.5	85.6	77.6	7855	89.7
1992	4354.0	600	83.4	85.2	81.6	84.2	82.6	78.2	7440	84.7
1993	4773.3	600	90.7	85.8	90.6	84.8	90.8	79.4	7956	90.8
1994	5157.9	600	98.3	86.9	97.8	86.0	98.1	81.1	8575	97.9
1995	3897.9	600	74.3	85.9	74.3	85.1	74.2	80.6	6541	74.7
1996	4892.0	600	92.8	86.4	92.8	85.6	92.8	81.5	8176	93.1
1997	4737.0	600	89.3	86.6	89.3	85.9	90.1	82.1	7821	89.3
1998	4555.4	600	86.9	86.6	86.9	86.0	86.7	82.4	7629	87.1
1999	5201.8	598	99.1	87.4	99.1	86.8	99.3	83.5	8700	99.3
2000	4064.5	643	78.2	86.8	78.1	86.2	72.0	82.8	6837	77.8
2001	5128.1	600	97.5	87.4	97.4	86.9	97.6	83.6	8564	97.8
2002	4385.5	600	84.0	87.2	83.4	86.7	83.4	83.6	7401	84.5
2003	5004.1	600	95.1	87.6	95.1	87.1	95.2	84.1	8367	95.5
2004	4589.6	600	87.5	87.6	87.5	87.1	87.1	84.3	7704	87.7
2005	4372.5	600	83.3	87.4	83.3	86.9	83.2	84.2	7341	83.8
2006	5052.1	600	96.2	87.8	96.2	87.3	96.1	84.7	8455	96.5
2007	4003.7	600	76.5	87.3	76.5	86.9	76.2	84.4	6771	77.3
2008	4368.6	600	82.9	87.2	82.9	86.7	82.9	84.3	7382	84.0
2009	5192.4	600	98.8	87.6	98.8	87.2	98.8	84.9	8705	99.4
2010	3908.7	600	74.9	87.1	74.4	86.7	74.4	84.5	6701	76.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		186		5	260	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				85		
D. Inspection, maintenance or repair without refuelling	1828			669		
E. Testing of plant systems or components				51	1	
H. Nuclear regulatory requirements				7	1	
J. Grid limitation, failure or grid unavailability					1	16
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
L. Human factor related		1			1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			43			
Subtotal	1828	187	43	817	267	16
Total		2058			1100	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		8
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		39
15. Reactor Cooling Systems		20
16. Steam generation systems		77
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		33
32. Feedwater and Main Steam System		24
33. Circulating Water System		1
41. Main Generator Systems	186	43
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems		1
Total	186	259

AM-19 ARMENIA-2

Operator: ANPPJSC (Joint Stock Company Armenian NPP)
Contractor: FAEA (Federal Atomic Energy Agency)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 375.0 MW(e)
Design Net Capacity: 375.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2286.5 GW(e).h
Energy Availability Factor: 69.7%
Load Factor: 69.6%
Operating Factor: 86.0%
Energy Unavailability Factor: 30.3%
Total Off-line Time: 1225 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	252,3	194,9	246,8	228,0	151,2	191,2	210,8	213,3	220,6	114,7	5,4	257,5	2286,5
EAF (%)	86,7	74,1	88,4	86,1	61,2	73,8	74,8	75,7	81,1	41,8	1,9	90,2	69,7
UCF (%)	86,7	74,1	88,4	86,7	62,8	78,6	81,4	81,7	85,2	42,9	1,9	90,2	71,8
LF (%)	90,4	77,3	88,6	84,4	54,2	70,8	75,5	76,4	81,7	41,0	2,0	92,3	69,6
OF (%)	100,0	100,0	100,0	100,0	89,0	90,1	100,0	100,0	100,0	48,9	4,0	100,0	86,0
EUf (%)	13,3	25,9	11,6	13,9	38,8	26,2	25,2	24,3	18,9	58,2	98,1	9,8	30,3
PUF (%)	8,0	21,3	8,0	8,0	32,3	8,0	8,0	8,0	8,0	55,1	98,1	9,2	22,6
UCLF (%)	5,3	4,6	3,6	5,3	4,8	13,4	10,6	10,3	6,8	2,0	0,0	0,6	5,6
XUF (%)	0,0	0,0	0,0	0,5	1,6	4,7	6,6	6,0	4,2	1,1	0,0	0,0	2,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE PLANNED 2010 OUTAGE, A NUMBER OF MEASURES FROM THE ADOPTED LIST OF MEASURES FOR UNIT 2 OF THE ANPP SAFETY UPGRADING FOR THE PERIOD 2009 - 2016 HAVE BEEN IMPLEMENTED.

5. Historical Summary

Date of Construction Start: 07 Jän 1975 **Lifetime Generation:** 53389.0 GW(e).h
Date of First Criticality: 01 Jän 1980 **Cumulative Energy Availability Factor:** 65.0%
Date of Grid Connection: 01 Mai 1980 **Cumulative Load Factor:** 63.8%
Date of Commercial Operation: 05 Mär 1980 **Cumulative Unit Capability Factor:** 67.0%
Cumulative Energy Unavailability Factor: 35.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980			Data not provided							
1981			"							
1982			"							
1983			"							
1984			"							
1985			"							
1986			"							
1987	2629,1	408	79,3	79,3	79,3	79,3	73,6	73,6	7040	80,4
1988	2254,5	376	73,4	76,5	73,4	76,5	68,3	71,0	6741	76,7
1989	671,3	376	99,6	78,9	99,6	78,9	82,7	72,2	1838	85,1
1990			Data not available - Long-term shutdown							
1991			"							
1992			"							
1993			"							
1994			"							
1995			Data not provided							
1996	2098,0	376	86,2	81,1	63,6	74,3	63,5	69,6	7561	86,1
1997	1430,0	376	43,4	72,4	43,4	67,2	43,4	63,6	5700	65,1
1998	1416,5	376	44,6	67,2	44,6	63,0	43,0	59,7	6408	73,2
1999	1890,4	376	57,4	65,7	57,4	62,1	57,4	59,4	6193	70,7
2000	1841,5	376	55,8	64,3	55,8	61,2	55,8	58,9	5699	64,9
2001	1815,4	376	55,1	63,2	55,1	60,5	55,1	58,4	5660	64,6
2002	2078,9	376	63,3	63,2	63,2	60,8	63,1	58,9	6961	79,5
2003	1997,6	376	63,4	63,2	60,6	60,8	60,6	59,1	6120	69,9
2004	2196,6	376	70,3	63,9	64,2	61,1	66,5	59,7	7135	81,2
2005	2504,5	376	76,3	64,9	76,3	62,3	76,0	61,1	7658	87,4
2006	2421,6	376	76,1	65,7	76,1	63,3	73,5	62,0	7632	87,1
2007	2347,8	376	73,8	66,3	73,8	64,1	71,3	62,6	7447	85,0
2008	2265,9	376	69,0	66,5	69,0	64,4	68,6	63,0	7013	79,8
2009	2290,4	375	71,3	66,7	69,9	64,7	69,7	63,4	7408	84,6
2010	2286,5	375	71,8	67,0	69,7	65,0	69,6	63,8	7535	86,0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		71			69	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	1072			1014		
D. Inspection, maintenance or repair without refuelling	82			88		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				65		
J. Grid limitation, failure or grid unavailability						10
Subtotal	1154	71	0	1167	71	10
Total		1225			1248	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems		0
13. Reactor Auxiliary Systems		9
15. Reactor Cooling Systems	71	6
16. Steam generation systems		8
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		0
41. Main Generator Systems		1
42. Electrical Power Supply Systems		3
Total	71	35

BE-2 DOEL-1

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)

Contractor: ACECOWEN (ACECOWEN (ACEC-COCKERILL-WESTINGHOUSE))

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 433.0 MW(e)
 Design Net Capacity: 392.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3401.4 GW(e).h
 Energy Availability Factor: 88.2%
 Load Factor: 89.7%
 Operating Factor: 89.1%
 Energy Unavailability Factor: 11.8%
 Total Off-line Time: 959 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	158,0	297,2	324,2	331,2	255,9	308,5	319,3	321,7	313,7	325,9	198,6	247,3	3401,4
EAF (%)	52,0	100,0	95,1	100,0	76,4	98,3	99,9	100,0	100,0	100,0	63,3	75,6	88,2
UCF (%)	52,0	100,0	95,1	100,0	76,4	98,3	99,9	100,0	100,0	100,0	63,3	75,6	88,3
LF (%)	49,0	102,1	100,8	106,2	79,4	98,9	99,1	99,9	100,6	101,0	63,7	76,8	89,7
OF (%)	54,4	100,0	96,6	100,0	77,2	98,6	100,0	100,0	100,0	100,0	63,6	79,4	89,1
EUUF (%)	48,0	0,0	4,9	0,0	23,6	1,7	0,1	0,0	0,0	0,0	36,7	24,4	11,8
PUF (%)	44,0	0,0	0,0	0,0	23,6	0,0	0,0	0,0	0,0	0,0	36,7	23,7	10,8
UCLF (%)	4,0	0,0	4,9	0,0	0,0	1,6	0,1	0,0	0,0	0,0	0,0	0,8	1,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION WITH THE NEW RUP (433MW) STARTS 14-01-2010 00:58. CONTINUATION 2009 TOT 14-01-2010
 : REFUELING OUTAGE 18-01-2010 : SCRAM 04-03 TO 05-03-2010 : SHUTDOWN TO REPAIR STEAM LEAKAGE
 TURBINE 16-05 TO 23-05-2010 : SHUTDOWN FOR THE PERFORMANCE OF PERIODIC SI-TESTS 10-06-2010 :
 SCRAM 20-11 TO 07-12-2010 : REFUELING OUTAGE

5. Historical Summary

Date of Construction Start: 07 Jän 1969 Lifetime Generation: 106827.2 GW(e).h
 Date of First Criticality: 18/07/1974 Cumulative Energy Availability Factor: 85.2%
 Date of Grid Connection: 28/08/1974 Cumulative Load Factor: 85.5%
 Date of Commercial Operation: 15/02/1975 Cumulative Unit Capability Factor: 86.1%
 Cumulative Energy Unavailability Factor: 14.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	2407,2	392	76,6	76,6	76,6	76,6	76,6	76,6	6672	83,2
1976	2667,1	395	75,5	76,0	75,5	76,0	76,9	76,7	6928	78,9
1977	2830,0	395	81,8	78,0	81,8	78,0	81,8	78,5	7332	83,7
1978	2731,2	395	78,9	78,2	78,9	78,2	78,9	78,6	7071	80,7
1979	3037,0	395	86,4	79,9	86,4	79,9	87,8	80,5	7812	89,2
1980	2901,0	395	84,4	80,6	84,4	80,6	83,6	81,0	7596	86,5
1981	2946,0	395	85,0	81,3	85,0	81,3	85,1	81,6	7644	87,3
1982	3184,5	395	91,2	82,5	91,2	82,5	92,0	82,9	8103	92,5
1983	2823,0	393	81,8	82,4	81,8	82,4	82,0	82,8	7316	83,5
1984	3129,0	393	90,2	83,2	90,2	83,2	90,6	83,6	7988	90,9
1985	2896,3	392	82,4	83,2	82,4	83,2	84,3	83,7	7330	83,7
1986	2685,9	392	79,1	82,8	78,8	82,8	78,2	83,2	7040	80,4
1987	2928,4	400	85,5	83,0	85,4	83,0	83,6	83,2	7306	83,4
1988	2694,1	400	86,6	83,3	81,3	82,9	76,7	82,8	7686	87,5
1989	2513,1	400	73,6	82,6	71,9	82,1	71,7	82,0	6475	73,9
1990	2859,9	400	85,6	82,8	83,5	82,2	81,6	82,0	7380	84,2
1991	3061,4	400	89,5	83,2	89,2	82,6	87,4	82,3	7860	89,7
1992	2990,5	400	87,7	83,5	86,5	82,9	85,1	82,5	7741	88,1
1993	2908,9	400	86,0	83,6	84,4	82,9	83,0	82,5	7580	86,5
1994	2921,8	400	88,7	83,9	84,3	83,0	83,4	82,5	7635	87,2
1995	2791,5	392	82,7	83,8	81,0	82,9	81,3	82,5	7342	83,8
1996	3169,4	392	91,5	84,2	91,3	83,3	92,0	82,9	8141	92,7
1997	3113,8	392	89,0	84,4	88,9	83,5	90,7	83,3	7899	90,2
1998	3292,5	392	94,1	84,8	93,7	84,0	95,9	83,8	8277	94,5
1999	3196,8	392	92,6	85,1	91,1	84,2	93,1	84,1	8123	92,7
2000	3264,8	392	94,2	85,4	92,3	84,6	94,8	84,6	8317	94,7
2001	3157,6	392	91,4	85,6	90,5	84,8	91,9	84,8	8098	92,4
2002	3260,7	392	93,4	85,9	93,3	85,1	95,0	85,2	8308	94,8
2003	3024,6	392	90,3	86,1	86,4	85,1	88,1	85,3	7953	90,8
2004	2989,1	392	87,6	86,1	85,5	85,1	86,8	85,3	7742	88,1
2005	3062,6	392	89,1	86,2	88,0	85,2	89,2	85,5	7849	89,6
2006	3100,5	392	91,1	86,4	89,2	85,3	90,3	85,6	8030	91,7
2007	3029,0	392	87,7	86,4	87,6	85,4	88,2	85,7	7709	88,0
2008	2690,3	392	77,3	86,1	77,3	85,2	78,1	85,5	6847	77,9
2009	2874,1	392	82,9	86,1	82,9	85,1	83,7	85,4	7266	82,9
2010	3401,4	433	88,3	86,1	88,2	85,2	89,7	85,5	7801	89,1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		55			203	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	731			793		
D. Inspection, maintenance or repair without refuelling				7		
E. Testing of plant systems or components	170			38	1	
H. Nuclear regulatory requirements					6	
J. Grid limitation, failure or grid unavailability						6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				22	42	
L. Human factor related					10	
P. Fire					0	
Z. Others					0	
Subtotal	901	55	0	860	264	6
Total		956			1130	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1974 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			9
12. Reactor I&C Systems			11
14. Safety Systems			8
15. Reactor Cooling Systems			37
16. Steam generation systems			39
31. Turbine and auxiliaries	24		67
32. Feedwater and Main Steam System	9		19
33. Circulating Water System			0
41. Main Generator Systems	20		6
42. Electrical Power Supply Systems			0
Total	53		196

BE-4 DOEL-2

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)
Contractor: ACECOWEN (ACECOWEN (ACEC-COCKERILL-WESTINGHOUSE))

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 433.0 MW(e)
Design Net Capacity: 392.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3411.4 GW(e).h
Energy Availability Factor: 88.3%
Load Factor: 89.9%
Operating Factor: 89.3%
Energy Unavailability Factor: 11.7%
Total Off-line Time: 936 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	329,9	291,8	340,9	314,0	0,0	234,5	319,5	320,7	313,2	303,2	315,9	327,8	3411,4
EAF (%)	100,0	98,1	99,9	94,7	0,0	75,2	100,0	100,0	100,0	93,2	100,0	100,0	88,3
UCF (%)	100,0	98,1	99,9	94,7	0,0	75,2	100,0	100,0	100,0	94,5	100,0	100,0	88,4
LF (%)	102,4	100,3	106,0	100,7	0,0	75,2	99,2	99,5	100,4	94,1	101,3	101,8	89,9
OF (%)	100,0	100,0	100,0	94,7	0,0	79,4	100,0	100,0	100,0	99,2	100,0	100,0	89,3
EUf (%)	0,0	1,9	0,1	5,3	100,0	24,8	0,0	0,0	0,0	6,8	0,0	0,0	11,7
PUf (%)	0,0	0,0	0,0	5,3	100,0	21,4	0,0	0,0	0,0	0,0	0,0	0,0	10,7
UCLF (%)	0,0	1,9	0,1	0,0	0,0	3,4	0,0	0,0	0,0	5,5	0,0	0,0	0,9
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,3	0,0	0,0	0,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

29-04-2010 : SCRAM 29-04 TO 06-06-2010 : REFUELING OUTAGE06-10-2010 : ISLAND MODE28-10-2010 : ISLAND MODE

5. Historical Summary

Date of Construction Start: 09 Jän 1971 **Lifetime Generation:** 102256.1 GW(e).h
Date of First Criticality: 08 Apr 1975 **Cumulative Energy Availability Factor:** 81.9%
Date of Grid Connection: 21/08/1975 **Cumulative Load Factor:** 82.4%
Date of Commercial Operation: 12 Jän 1975 **Cumulative Unit Capability Factor:** 82.8%
Cumulative Energy Unavailability Factor: 18.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	266,4	392	91,3	91,3	91,3	91,3	91,3	91,3	694	93,3
1976	2462,8	395	71,6	73,2	71,6	73,2	71,0	72,6	6519	74,2
1977	2576,8	395	74,3	73,7	74,3	73,7	74,5	73,5	6649	75,9
1978	2750,6	395	79,5	75,6	79,5	75,6	79,5	75,4	7114	81,2
1979	2593,3	395	74,6	75,3	74,6	75,3	74,9	75,3	6639	75,8
1980	2782,0	395	79,7	76,2	79,7	76,2	80,2	76,3	7111	81,0
1981	2841,7	395	81,4	77,1	81,4	77,1	82,1	77,2	7226	82,5
1982	2582,0	395	73,8	76,6	73,8	76,6	74,6	76,9	6598	75,3
1983	2017,0	393	58,0	74,3	58,0	74,3	58,6	74,6	5190	59,2
1984	2916,0	393	84,1	75,4	84,1	75,4	84,5	75,7	7508	85,5
1985	2908,7	392	83,0	76,1	83,0	76,1	84,7	76,6	7341	83,8
1986	2282,6	392	69,8	75,6	69,8	75,6	66,5	75,7	5891	67,2
1987	2616,4	400	77,8	75,8	76,8	75,7	74,7	75,6	6612	75,5
1988	2906,7	400	83,2	76,3	82,6	76,2	82,7	76,1	7408	84,3
1989	2479,8	400	71,8	76,0	70,8	75,8	70,8	75,8	6436	73,5
1990	1982,6	400	66,5	75,4	56,6	74,5	56,6	74,5	5170	59,0
1991	2779,8	400	81,2	75,7	81,0	74,9	79,3	74,8	7136	81,5
1992	2971,9	400	86,3	76,4	86,1	75,6	84,6	75,4	7617	86,7
1993	2949,5	400	85,9	76,9	85,7	76,2	84,2	75,9	7551	86,2
1994	2982,4	392	87,3	77,4	86,2	76,7	86,9	76,4	7810	89,2
1995	2867,5	392	82,9	77,7	82,7	77,0	83,5	76,8	7342	83,8
1996	2888,8	392	83,4	78,0	83,1	77,3	83,9	77,1	7390	84,1
1997	2935,0	392	87,7	78,4	84,5	77,6	85,5	77,5	7749	88,5
1998	3145,0	392	90,2	78,9	90,1	78,1	91,6	78,1	7987	91,2
1999	3091,7	392	89,6	79,4	88,9	78,6	90,0	78,6	7875	89,9
2000	3135,6	392	90,4	79,8	89,8	79,0	91,1	79,1	8022	91,3
2001	3150,5	392	90,9	80,2	90,3	79,4	91,7	79,6	8060	92,0
2002	3104,5	392	91,4	80,6	89,5	79,8	90,4	80,0	8076	92,2
2003	3142,6	392	93,1	81,1	90,1	80,2	91,5	80,4	8184	93,4
2004	2951,9	413	81,9	81,1	80,5	80,2	81,3	80,4	7174	81,7
2005	3506,7	433	91,3	81,5	90,8	80,6	92,4	80,8	8036	91,7
2006	3399,3	433	90,1	81,8	88,2	80,8	89,6	81,1	7954	90,8
2007	3483,1	433	90,8	82,1	90,8	81,2	91,8	81,5	7985	91,2
2008	3478,9	433	90,3	82,3	90,3	81,5	91,5	81,8	8000	91,1
2009	3468,5	433	90,1	82,6	90,1	81,7	91,4	82,1	7941	90,7
2010	3411,4	433	88,4	82,8	88,3	81,9	89,9	82,4	7823	89,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		24			294	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	905			804		
D. Inspection, maintenance or repair without refuelling				150		
E. Testing of plant systems or components				82	12	
J. Grid limitation, failure or grid unavailability			7			12
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				8	10	
L. Human factor related					3	
Z. Others					0	
Subtotal	905	24	7	1044	332	12
Total		936			1388	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1975 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		8
14. Safety Systems	0	8
15. Reactor Cooling Systems	23	23
16. Steam generation systems		83
31. Turbine and auxiliaries		81
32. Feedwater and Main Steam System		16
41. Main Generator Systems		11
42. Electrical Power Supply Systems	0	8
Total	23	251

BE-5 DOEL-3

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)
Contractor: FRAMACEC (FRAMACECO (FRAMATOME-ACEC-COCKERILL))

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1006.0 MW(e)
Design Net Capacity: 890.0 MW(e)
Design Discharge Burnup: 49000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7817.2 GW(e).h
Energy Availability Factor: 88.2%
Load Factor: 88.7%
Operating Factor: 89.7%
Energy Unavailability Factor: 11.8%
Total Off-line Time: 898 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	759,2	687,3	754,9	729,8	714,5	364,1	217,1	623,0	724,7	753,7	732,8	756,2	7817,2
EAF (%)	100,0	100,0	100,0	100,0	95,3	50,2	29,4	84,1	100,0	100,0	100,0	100,0	88,2
UCF (%)	100,0	100,0	100,0	100,0	100,0	59,2	29,4	84,1	100,0	100,0	100,0	100,0	89,3
LF (%)	101,4	101,7	101,0	100,8	95,5	50,3	29,0	83,2	100,1	100,6	101,2	101,0	88,7
OF (%)	100,0	100,0	100,0	100,0	100,0	59,7	33,3	84,9	100,0	100,0	100,0	100,0	89,7
EUF (%)	0,0	0,0	0,0	0,0	4,7	49,8	70,6	15,9	0,0	0,0	0,0	0,0	11,8
PUF (%)	0,0	0,0	0,0	0,0	0,0	40,8	54,9	0,1	0,0	0,0	0,0	0,0	8,0
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	15,7	15,9	0,0	0,0	0,0	0,0	2,7
XUF (%)	0,0	0,0	0,0	0,0	4,7	8,9	0,0	0,0	0,0	0,0	0,0	0,0	1,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

18-06 TO 20-07-2010 : REFUELING OUTAGE
28-07-2010 : SCRAM
12-08-2010 : SCRAM
25-08 TO 29-08-2010 : SHUTDOWN TO REPAIR THE MAIN ENTRANCE TO THE REACTOR BUILDING

5. Historical Summary

Date of Construction Start: 01 Jän 1975
Date of First Criticality: 14/06/1982
Date of Grid Connection: 23/06/1982
Date of Commercial Operation: 10 Jän 1982
Lifetime Generation: 205385.8 GW(e).h
Cumulative Energy Availability Factor: 86.1%
Cumulative Load Factor: 86.0%
Cumulative Unit Capability Factor: 87.4%
Cumulative Energy Unavailability Factor: 13.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	1764,0	944	88,8	88,8	88,8	88,8	88,8	88,8	2033	92,1
1983	6705,0	900	85,0	85,8	85,0	85,8	85,0	85,8	7807	89,1
1984	7074,0	900	89,5	87,5	89,5	87,5	89,5	87,4	8084	92,0
1985	6496,3	900	82,4	85,9	82,4	85,9	82,4	85,9	7515	85,8
1986	6860,0	897	88,5	86,5	88,5	86,5	87,3	86,2	8007	91,4
1987	5713,2	897	75,7	84,4	73,5	84,0	72,7	83,7	6905	78,8
1988	6777,5	890	88,7	85,1	85,9	84,3	86,7	84,1	7875	89,7
1989	5774,9	900	82,1	84,7	73,4	82,8	73,2	82,6	7470	85,3
1990	6811,8	900	89,9	85,3	86,4	83,3	86,4	83,1	8021	91,6
1991	6742,9	900	90,0	85,8	85,8	83,5	85,5	83,4	7913	90,3
1992	6732,2	900	92,3	86,5	90,1	84,2	85,2	83,5	7778	88,5
1993	5377,2	900	69,6	85,0	65,8	82,5	68,2	82,2	6198	70,8
1994	7482,3	970	88,4	85,3	87,7	83,0	88,1	82,7	7888	90,0
1995	7025,1	970	83,4	85,1	82,6	83,0	82,7	82,7	7396	84,4
1996	7334,2	993	84,4	85,1	83,8	83,0	84,0	82,8	7447	84,8
1997	8108,2	1006	93,5	85,7	91,9	83,7	92,0	83,4	8250	94,2
1998	8012,6	1006	92,0	86,1	90,9	84,2	90,9	83,9	8171	93,3
1999	8231,2	1006	94,8	86,6	93,4	84,7	93,4	84,5	8330	95,1
2000	7884,9	1006	89,3	86,8	89,0	85,0	89,2	84,8	7892	89,8
2001	7993,3	1006	90,9	87,0	90,2	85,3	90,7	85,1	7989	91,2
2002	7636,6	1006	86,7	87,0	86,2	85,3	86,7	85,2	7647	87,3
2003	7870,8	1006	89,8	87,1	89,7	85,5	89,3	85,4	7928	90,5
2004	7984,8	1006	91,6	87,4	90,8	85,8	90,4	85,7	8104	92,3
2005	7962,7	1006	92,4	87,6	91,1	86,0	90,4	85,9	8147	93,0
2006	7708,7	1006	88,2	87,6	87,3	86,1	87,5	85,9	7764	88,6
2007	7697,1	1006	87,2	87,6	87,1	86,1	87,3	86,0	7710	88,0
2008	6943,5	1006	78,5	87,2	78,5	85,8	78,6	85,7	6980	79,5
2009	7987,1	1006	90,4	87,4	90,4	86,0	90,6	85,9	7947	90,7
2010	7817,2	1006	89,3	87,4	88,2	86,1	88,7	86,0	7862	89,7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		129			184	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	664			712	2	
D. Inspection, maintenance or repair without refuelling				7		
E. Testing of plant systems or components				0	1	
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	
L. Human factor related		97			11	
P. Fire					0	
Subtotal	664	226	0	719	208	0
Total		890			927	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	98	10
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		1
14. Safety Systems		0
15. Reactor Cooling Systems	13	63
16. Steam generation systems		48
17. Safety I&C Systems (excluding reactor I&C)		16
31. Turbine and auxiliaries	17	17
32. Feedwater and Main Steam System		14
41. Main Generator Systems		6
42. Electrical Power Supply Systems		5
Total	128	182

BE-7 DOEL-4

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)

Contractor: ACECOWEN (ACECOWEN (ACEC-COCKERILL-WESTINGHOUSE))

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1047.0 MW(e)
 Design Net Capacity: 1000.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7395.4 GW(e).h
 Energy Availability Factor: 81.6%
 Load Factor: 81.3%
 Operating Factor: 82.1%
 Energy Unavailability Factor: 18.4%
 Total Off-line Time: 1568 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	263,2	283,8	774,0	750,5	773,4	713,1	756,0	759,3	741,7	762,8	749,7	67,8	7395,4
EAF (%)	33,6	40,2	100,0	100,0	100,0	96,4	100,0	100,0	100,0	98,8	100,0	8,7	81,6
UCF (%)	33,7	40,2	100,0	100,0	100,0	96,4	100,0	100,0	100,0	98,8	100,0	8,7	81,6
LF (%)	33,8	40,7	100,4	100,4	100,1	95,4	97,9	98,3	99,2	98,6	100,3	8,8	81,3
OF (%)	33,6	43,6	100,0	100,0	100,0	97,8	100,0	100,0	100,0	100,0	100,0	8,7	82,1
EUF (%)	66,4	59,8	0,0	0,0	0,0	3,6	0,0	0,0	0,0	1,2	0,0	91,3	18,4
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
UCLF (%)	66,4	59,8	0,0	0,0	0,0	3,6	0,0	0,0	0,0	1,2	0,0	91,3	18,4
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

11-01 TO 16-02-2010 : SCRAM AND SHUTDOWN FOR INSPECTION AND REPAIR DAMAGE LD

TURBINE15-06-2010 : SCRAM03-12-2010 TO BEGIN 2011 : FIRE HYDROGEN COOLING GAS SYSTEM WITH TRIP MAIN GENERATOR AND REACTOR SCRAM (SHUTDOWN TO REPAIR)

5. Historical Summary

Date of Construction Start: 12 Jän 1978 Lifetime Generation: 187340.0 GW(e).h
 Date of First Criticality: 31/03/1985 Cumulative Energy Availability Factor: 83.7%
 Date of Grid Connection: 04 Aug 1985 Cumulative Load Factor: 83.4%
 Date of Commercial Operation: 07 Jän 1985 Cumulative Unit Capability Factor: 84.4%
 Cumulative Energy Unavailability Factor: 16.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1985	3574,9	981	82,6	82,6	82,6	82,6	82,6	82,6	82,6	3884	87,9
1986	7722,9	1006	87,8	86,1	87,8	86,1	87,6	86,0	86,0	7973	91,0
1987	6809,3	1006	81,4	84,2	77,0	82,4	77,3	82,5	82,5	7448	85,0
1988	7552,0	1000	87,6	85,2	85,9	83,4	86,0	83,5	83,5	7784	88,6
1989	7445,9	1010	87,4	85,7	84,4	83,7	84,2	83,6	83,6	7737	88,3
1990	7535,8	1010	88,2	86,1	85,3	83,9	85,2	83,9	83,9	7790	88,9
1991	7425,4	1010	84,8	85,9	84,1	84,0	83,9	83,9	83,9	7673	87,6
1992	7418,6	1010	86,7	86,0	85,9	84,2	83,6	83,9	83,9	7481	85,2
1993	6980,9	1010	79,6	85,3	78,9	83,6	78,9	83,3	83,3	7112	81,2
1994	3462,7	1001	39,2	80,4	39,2	78,9	39,5	78,7	78,7	3637	41,5
1995	6769,7	1001	76,9	80,1	76,8	78,7	77,2	78,6	78,6	7381	84,3
1996	6186,8	1001	70,6	79,3	69,9	78,0	70,4	77,8	77,8	6565	74,7
1997	7548,7	1001	87,1	79,9	87,0	78,7	86,1	78,5	78,5	7653	87,4
1998	7844,0	985	90,0	80,6	90,0	79,5	90,9	79,4	79,4	7998	91,3
1999	8008,4	985	92,5	81,4	92,4	80,4	92,8	80,3	80,3	8150	93,0
2000	7992,9	985	92,0	82,1	92,0	81,1	92,4	81,1	81,1	8323	94,8
2001	8098,9	985	93,3	82,8	93,2	81,8	93,9	81,8	81,8	8264	94,3
2002	7831,9	985	90,6	83,2	90,4	82,3	90,8	82,3	82,3	8017	91,5
2003	7781,2	985	91,1	83,6	90,5	82,8	90,2	82,8	82,8	8015	91,5
2004	7519,8	985	88,4	83,9	87,0	83,0	86,9	83,0	83,0	7843	89,3
2005	7394,8	985	86,1	84,0	85,9	83,1	85,7	83,1	83,1	7647	87,3
2006	7462,0	1008	86,5	84,1	86,2	83,3	84,5	83,2	83,2	7633	87,1
2007	8496,9	1008	98,1	84,7	98,1	83,9	96,2	83,8	83,8	8608	98,3
2008	7466,7	1008	85,2	84,8	85,2	84,0	84,3	83,8	83,8	7534	85,8
2009	6911,0	1047	78,3	84,5	78,3	83,8	77,8	83,5	83,5	6946	79,3
2010	7395,4	1038	81,6	84,4	81,6	83,7	81,3	83,4	83,4	7192	82,1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		873			288	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				809		
D. Inspection, maintenance or repair without refuelling				25		
E. Testing of plant systems or components				1	0	
H. Nuclear regulatory requirements		16			0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					45	0
L. Human factor related					26	
P. Fire		679				
Subtotal	0	1568	0	835	360	0
Total		1568			1195	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		1
14. Safety Systems		5
15. Reactor Cooling Systems		22
16. Steam generation systems		194
31. Turbine and auxiliaries	873	44
32. Feedwater and Main Steam System		12
33. Circulating Water System		0
41. Main Generator Systems		4
42. Electrical Power Supply Systems		2
Total	873	284

BE-3 TIHANGE-1

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)
Contractor: ACLF ((ACECOWEN - CREUSOT LOIRE - FRAMATOME))

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 962.0 MW(e)
Design Net Capacity: 870.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7316.1 GW(e).h
Energy Availability Factor: 86.4%
Load Factor: 86.8%
Operating Factor: 88.5%
Energy Unavailability Factor: 13.6%
Total Off-line Time: 1008 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	731,8	621,3	400,1	36,0	712,8	681,7	622,7	695,7	685,9	716,2	696,1	715,8	7316,1
EAF (%)	100,0	94,9	55,9	5,2	99,6	98,4	87,0	97,8	99,1	99,8	100,0	97,8	86,4
UCF (%)	100,0	95,2	61,6	5,2	99,7	100,0	89,7	99,9	100,0	99,9	100,0	97,8	87,5
LF (%)	102,2	96,1	56,0	5,2	99,6	98,4	87,0	97,2	99,0	99,9	100,5	100,0	86,8
OF (%)	100,0	97,3	62,2	13,1	100,0	100,0	90,5	100,0	100,0	100,0	100,0	98,4	88,5
EUF (%)	0,0	5,1	44,1	94,8	0,4	1,6	13,0	2,2	0,9	0,2	0,0	2,2	13,6
PUF (%)	0,0	0,0	38,4	94,8	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	11,1
UCLF (%)	0,0	4,8	0,0	0,0	0,0	0,0	10,3	0,1	0,0	0,2	0,0	2,2	1,5
XUF (%)	0,0	0,3	5,7	0,0	0,1	1,6	2,7	2,1	0,9	0,0	0,0	0,0	1,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

2010-02-23 : SCRAM.2010-03-01 : NORTH GROUP SHUTDOWN (PROBLEM DUE TO HURRICANE)2010-03-20 :
 PLANNED SHUTDOWN FOR INSPECTION AND REFUELLING2010-07-18 : COLD SHUTDOWN (LEAK)2010-10-22 :
 IMPORTANT POWER DECREASE ON SOUTH GROUP.2010-12-18 : HOT STANDBY FOR OIL SUPPLEMENT ON
 PRIMARY PUMP.

5. Historical Summary

Date of Construction Start: 06 Jän 1970 **Lifetime Generation:** 237104.1 GW(e).h
Date of First Criticality: 21/02/1975 **Cumulative Energy Availability Factor:** 84.0%
Date of Grid Connection: 03 Jul 1975 **Cumulative Load Factor:** 83.7%
Date of Commercial Operation: 10 Jän 1975 **Cumulative Unit Capability Factor:** 86.4%
Cumulative Energy Unavailability Factor: 16.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	1463,0	885	76,2	76,2	76,2	76,2	76,2	76,2	2087	94,5
1976	4409,5	870	89,8	87,0	57,5	61,3	57,7	61,4	6354	72,3
1977	5842,3	870	76,7	82,4	76,7	68,1	76,7	68,2	7234	82,6
1978	6371,0	870	84,3	83,0	84,3	73,1	83,6	72,9	7582	86,6
1979	5159,0	870	67,6	79,4	67,6	71,8	67,7	71,7	6121	69,9
1980	6173,0	870	80,7	79,6	80,7	73,5	80,8	73,4	7337	83,5
1981	6414,2	870	83,8	80,3	83,8	75,1	84,2	75,1	7762	88,6
1982	6164,8	870	80,8	80,4	80,8	75,9	80,9	75,9	7269	83,0
1983	5843,0	870	76,5	79,9	76,5	76,0	76,7	76,0	7135	81,4
1984	6374,0	870	83,4	80,3	83,4	76,8	83,4	76,8	7774	88,5
1985	5979,0	870	90,8	81,3	81,1	77,2	78,5	77,0	8077	92,2
1986	4005,0	870	59,2	79,3	54,8	75,2	52,6	74,8	5429	62,0
1987	7337,0	870	98,5	80,9	97,6	77,0	96,3	76,6	8733	99,7
1988	6310,0	870	84,9	81,2	83,9	77,6	82,6	77,0	7520	85,6
1989	6508,0	870	88,4	81,7	87,9	78,3	85,4	77,6	7854	89,7
1990	6683,0	870	90,9	82,3	88,4	78,9	87,7	78,3	8082	92,3
1991	6163,0	870	86,7	82,6	81,0	79,1	80,9	78,4	7714	88,1
1992	6059,0	870	80,5	82,5	79,1	79,1	79,3	78,5	7807	88,9
1993	7317,0	870	99,8	83,4	96,4	80,0	96,0	79,4	8459	96,6
1994	6737,0	863	90,7	83,8	90,0	80,5	89,1	79,9	8018	91,5
1995	5442,0	882	72,9	83,2	70,0	80,0	70,4	79,5	6488	74,1
1996	7210,7	931	88,4	83,5	88,2	80,4	88,2	79,9	7823	89,1
1997	7942,6	962	95,5	84,1	94,3	81,1	94,3	80,6	8385	95,7
1998	7264,0	962	87,4	84,2	86,3	81,3	86,2	80,9	7777	88,8
1999	7272,0	962	86,9	84,4	85,5	81,5	86,3	81,1	7905	90,2
2000	8457,0	962	99,3	85,0	99,3	82,3	100,1	81,9	8782	100,0
2001	6969,0	962	91,2	85,3	82,5	82,3	82,7	82,0	7481	85,4
2002	7047,2	962	86,0	85,3	83,9	82,4	83,6	82,0	7631	87,1
2003	7990,4	962	95,5	85,7	95,1	82,9	94,8	82,5	8552	97,6
2004	7106,5	962	84,5	85,6	84,5	82,9	84,1	82,6	7456	84,9
2005	6811,0	962	82,7	85,5	80,2	82,8	80,8	82,5	7403	84,5
2006	8186,9	962	98,8	86,0	98,8	83,4	97,1	83,0	8693	99,2
2007	7055,9	962	85,6	86,0	85,1	83,4	83,7	83,0	7627	87,1
2008	7264,5	962	86,2	86,0	85,3	83,5	86,0	83,1	7650	87,1
2009	8269,5	962	98,7	86,4	97,8	83,9	98,1	83,6	8679	99,1
2010	7316,1	962	87,5	86,4	86,4	84,0	86,8	83,7	7752	88,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		82			108	
C. Inspection, maintenance or repair combined with refuelling	907			812		
D. Inspection, maintenance or repair without refuelling				11		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						8
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	79
L. Human factor related		17			1	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						1
Z. Others					1	
Subtotal	907	99	0	823	114	88
Total		1006			1025	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1975 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
12. Reactor I&C Systems			8
14. Safety Systems			10
15. Reactor Cooling Systems	82		29
16. Steam generation systems			16
31. Turbine and auxiliaries			12
32. Feedwater and Main Steam System			12
33. Circulating Water System			1
35. All other I&C Systems			0
41. Main Generator Systems			2
42. Electrical Power Supply Systems			12
XX. Miscellaneous Systems			0
Total	82		102

BE-6 TIHANGE-2

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)

Contractor: FRAMACEC (FRAMACECO (FRAMATOME-ACEC-COCKERILL))

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1008.0 MW(e)
 Design Net Capacity: 900.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8823.8 GW(e).h
 Energy Availability Factor: 99.2%
 Load Factor: 99.9%
 Operating Factor: 99.6%
 Energy Unavailability Factor: 0.8%
 Total Off-line Time: 34 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	758,4	685,9	761,9	736,3	731,3	722,1	734,7	740,8	724,8	760,0	732,3	735,3	8823,8
EAF (%)	100,0	100,0	100,0	100,0	97,2	99,6	98,4	99,6	99,9	100,0	100,0	96,7	99,2
UCF (%)	100,0	100,0	100,0	100,0	97,2	100,0	100,0	100,0	99,9	100,0	100,0	96,9	99,5
LF (%)	101,1	101,3	101,7	101,5	97,5	99,5	98,0	98,8	99,9	101,2	100,9	98,0	99,9
OF (%)	100,0	100,0	100,0	100,0	97,6	100,0	100,0	100,0	100,0	100,0	100,0	97,8	99,6
EUUF (%)	0,0	0,0	0,0	0,0	2,8	0,4	1,6	0,4	0,1	0,0	0,0	3,3	0,8
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
UCLF (%)	0,0	0,0	0,0	0,0	2,9	0,0	0,0	0,0	0,1	0,0	0,0	3,1	0,5
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,4	1,6	0,4	0,0	0,0	0,0	0,2	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

2010-05-07 : UNPLANNED SHUTDOWN DUE TO IMPORTANT LEAK ON VALVE.2010-12-25 : LOSSES DUE TO STRETCH-OUT.2010-12-28 : HOT STANDBY DUE TO PRIMARY LEAK.

5. Historical Summary

Date of Construction Start: 04 Jän 1976 Lifetime Generation: 202959.4 GW(e).h
 Date of First Criticality: 10 Mai 1982 Cumulative Energy Availability Factor: 87.9%
 Date of Grid Connection: 13/10/1982 Cumulative Load Factor: 87.7%
 Date of Commercial Operation: 06 Jän 1983 Cumulative Unit Capability Factor: 89.0%
 Cumulative Energy Unavailability Factor: 12.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	4022,0	901	86,9	86,9	86,9	86,9	86,9	86,9	4612	89,8
1984	6856,0	901	86,4	86,6	86,4	86,6	86,6	86,7	7693	87,6
1985	6636,0	900	89,4	87,7	87,8	87,0	84,2	85,7	7890	90,1
1986	6189,0	900	85,0	86,9	83,1	85,9	78,5	83,7	7509	85,7
1987	6584,0	900	84,3	86,3	83,4	85,4	83,5	83,7	7477	85,4
1988	6966,0	900	89,9	87,0	87,9	85,8	88,1	84,5	7992	91,0
1989	6663,0	901	86,0	86,8	84,7	85,7	84,4	84,5	7728	88,2
1990	6919,0	901	88,5	87,1	88,0	86,0	87,7	84,9	7827	89,3
1991	6850,0	901	88,4	87,2	87,7	86,2	86,8	85,1	7790	88,9
1992	6746,0	901	89,7	87,5	86,9	86,3	85,2	85,1	7912	90,1
1993	6555,0	901	86,4	87,4	83,6	86,0	83,1	84,9	7507	85,7
1994	7585,0	894	98,3	88,3	96,7	86,9	96,9	85,9	8501	97,0
1995	6849,0	921	90,2	88,5	85,0	86,8	84,9	85,9	7697	87,9
1996	7253,0	943	88,6	88,5	87,0	86,8	87,5	86,0	7810	88,9
1997	6854,0	960	82,3	88,0	81,3	86,4	81,5	85,7	7241	82,7
1998	7664,0	960	91,0	88,2	90,6	86,7	91,1	86,0	8015	91,5
1999	8111,0	960	95,5	88,7	95,5	87,2	96,4	86,7	8380	95,7
2000	7481,0	960	89,4	88,7	88,0	87,3	88,7	86,8	7901	89,9
2001	6976,0	960	80,8	88,3	80,7	86,9	83,0	86,6	7137	81,5
2002	7833,4	1008	89,0	88,3	87,9	87,0	88,7	86,7	7821	89,3
2003	7601,0	1008	86,3	88,2	85,6	86,9	86,1	86,7	7589	86,6
2004	8517,3	1008	96,4	88,6	96,0	87,3	96,2	87,2	8478	96,5
2005	7890,0	1008	90,1	88,7	89,5	87,4	89,4	87,3	7929	90,5
2006	7219,3	1008	83,0	88,4	82,4	87,2	81,8	87,0	7348	83,9
2007	8751,6	1008	100,0	88,9	99,9	87,8	99,1	87,5	8760	100,0
2008	7129,3	1008	81,1	88,6	80,4	87,5	80,5	87,2	7165	81,6
2009	7732,3	1008	86,8	88,5	86,7	87,4	87,6	87,3	7664	87,5
2010	8823,8	1008	99,5	89,0	99,2	87,9	99,9	87,7	8726	99,6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		33			115	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling				731	5	
D. Inspection, maintenance or repair without refuelling				83		
E. Testing of plant systems or components					2	
G. Major back-fitting, refurbishment or upgrading activities without refuelling						14
H. Nuclear regulatory requirements					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				13	25	
L. Human factor related					2	
Subtotal	0	33	0	827	162	14
Total		33			1003	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		6
14. Safety Systems		2
15. Reactor Cooling Systems	18	14
16. Steam generation systems	15	26
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		10
41. Main Generator Systems		1
42. Electrical Power Supply Systems		14
Total	33	94

BE-8 TIHANGE-3

Operator: ELECTRAB (ELECTRABEL M. V. NUCLEAIRE PRODUKTIE)
Contractor: ACECOWEN (ACECOWEN (ACEC-COCKERILL-WESTINGHOUSE))

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1054.0 MW(e)
Design Net Capacity: 1020.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7563.2 GW(e).h
Energy Availability Factor: 81.9%
Load Factor: 82.0%
Operating Factor: 85.5%
Energy Unavailability Factor: 18.1%
Total Off-line Time: 1271 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	788,2	713,7	785,8	762,2	781,0	745,8	731,8	771,7	244,4	0,7	460,0	777,8	7563,2
EAF (%)	100,0	100,0	100,0	100,0	99,9	98,4	93,3	98,4	32,2	0,1	61,1	99,8	81,9
UCF (%)	100,0	100,0	100,0	100,0	100,0	100,0	96,2	100,0	33,3	0,1	61,1	99,9	82,5
LF (%)	100,5	100,8	100,3	100,4	99,6	98,3	93,3	98,4	32,2	0,1	61,1	99,9	82,0
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	33,5	1,1	92,4	100,0	85,5
EUF (%)	0,0	0,0	0,0	0,0	0,1	1,6	6,7	1,6	67,8	99,9	38,9	0,2	18,1
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	66,7	77,9	5,9	0,0	12,6
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	3,8	0,0	0,0	22,0	33,0	0,2	4,9
XUF (%)	0,0	0,0	0,0	0,0	0,1	1,6	2,8	1,6	1,1	0,0	0,0	0,0	0,6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

2010-07-11 : POWER DECREASE TO 14 % PN DUE TO CLOSING OF HEAT VALVE ON DRIER-SUPERHEATER.2010-09-11 : SHUTDOWN FOR MAINTENANCE & REFUELING.2010-10-25 : MAINTENANCE & REFUELING EXTENSION.2010-10-31 : 1 MANUAL TURBINE TRIP + 1 SCRAM.2010-11-03 : POWER DECREASE TO 50 %.2010-11-19 : 1 TURBINE TRIP.2010-11-21 : 1 TURBINE TRIP.2010-11-23 : 1 TURBINE TRIP + MANUAL REACTOR STOP.

5. Historical Summary

Date of Construction Start: 11 Jän 1978 **Lifetime Generation:** 198200.5 GW(e).h
Date of First Criticality: 06 Mai 1985 **Cumulative Energy Availability Factor:** 87.4%
Date of Grid Connection: 15/06/1985 **Cumulative Load Factor:** 87.1%
Date of Commercial Operation: 09 Jän 1985 **Cumulative Unit Capability Factor:** 89.0%
Cumulative Energy Unavailability Factor: 12.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985			Data not provided							
1986	7558,0	1020	86,5	86,5	85,6	85,6	84,6	84,6	7733	88,3
1987	7829,0	1020	89,0	87,8	87,3	86,4	87,6	86,1	7872	89,9
1988	7623,0	1020	87,4	87,6	85,0	86,0	85,1	85,8	7773	88,5
1989	7749,0	1020	87,5	87,6	87,0	86,2	86,7	86,0	7790	88,9
1990	7794,0	1020	90,0	88,1	87,1	86,4	87,2	86,2	7924	90,5
1991	7649,0	1020	88,3	88,1	86,2	86,4	85,6	86,1	7903	90,2
1992	8335,0	1020	93,4	88,9	93,3	87,4	93,0	87,1	8246	93,9
1993	7748,0	1020	89,5	88,9	88,1	87,4	86,7	87,1	7874	89,9
1994	7480,0	1015	86,8	88,7	84,7	87,1	84,1	86,7	7666	87,5
1995	7559,0	1015	86,7	88,5	84,7	86,9	85,0	86,6	7632	87,1
1996	7189,0	1015	81,1	87,8	81,1	86,4	80,6	86,0	7142	81,3
1997	8357,0	1015	99,2	88,8	94,4	87,0	94,0	86,7	8342	95,2
1998	6738,0	1015	77,9	87,9	75,9	86,2	75,8	85,9	6903	78,8
1999	8799,0	1015	99,1	88,7	98,9	87,1	99,0	86,8	8686	99,2
2000	7597,0	1015	86,4	88,6	84,9	86,9	85,2	86,7	7656	87,2
2001	7729,0	1015	89,9	88,7	86,5	86,9	86,9	86,7	7929	90,5
2002	8340,5	1015	95,7	89,1	93,7	87,3	93,8	87,1	8368	95,5
2003	7661,5	1015	89,4	89,1	86,5	87,3	86,2	87,1	7846	89,6
2004	7936,4	1015	90,4	89,2	89,2	87,4	89,0	87,2	7969	90,7
2005	8707,5	1015	99,8	89,7	99,6	88,0	97,9	87,7	8753	99,9
2006	7237,6	1015	86,1	89,5	83,3	87,8	81,4	87,4	7592	86,7
2007	7339,4	1015	83,4	89,2	83,0	87,5	82,5	87,2	7406	84,5
2008	8385,3	1015	94,3	89,5	93,9	87,8	94,0	87,5	8365	95,2
2009	7717,2	1054	85,2	89,3	84,6	87,7	84,6	87,4	7480	85,4
2010	7563,2	1046	82,5	89,0	81,9	87,4	82,0	87,1	7489	85,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		215			123	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1055			645	10	
D. Inspection, maintenance or repair without refuelling				32		
E. Testing of plant systems or components				1		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				21		15
H. Nuclear regulatory requirements					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				6		
L. Human factor related					0	
Subtotal	1055	215	0	705	139	15
Total		1270			859	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
15. Reactor Cooling Systems		25
16. Steam generation systems		42
31. Turbine and auxiliaries	202	31
32. Feedwater and Main Steam System		2
33. Circulating Water System		8
41. Main Generator Systems	12	2
42. Electrical Power Supply Systems		5
Total	214	120

BR-1 ANGRA-1

Operator: ELETRONU (ELETROBRAS ELETRONUCLEAR S.A.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 609.0 MW(e)
Design Net Capacity: 626.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4201.3 GW(e).h
Energy Availability Factor: 79.0%
Load Factor: 78.8%
Operating Factor: 80.4%
Energy Unavailability Factor: 21.0%
Total Off-line Time: 1720 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	453.1	395.3	447.9	290.5	434.8	437.8	233.9	128.5	343.3	201.3	418.8	416.1	4201.3
EAF (%)	100.0	100.0	98.8	66.3	96.0	99.9	51.6	28.4	78.3	44.4	95.5	91.8	79.0
UCF (%)	100.0	100.0	98.8	66.3	96.0	99.9	51.6	28.4	78.3	44.4	95.5	91.8	79.0
LF (%)	100.0	96.6	98.8	66.3	96.0	99.9	51.6	28.4	78.3	44.4	95.5	91.8	78.8
OF (%)	100.0	100.0	100.0	66.3	96.0	100.0	51.6	28.4	83.3	46.2	100.0	95.4	80.4
EUf (%)	0.0	0.0	1.2	33.8	4.0	0.1	48.4	71.6	21.7	55.6	4.5	8.2	21.0
PUf (%)	0.0	0.0	0.0	33.8	0.0	0.1	48.4	65.1	0.0	55.6	0.0	7.1	17.7
UCLF (%)	0.0	0.0	1.2	0.0	4.0	0.0	0.0	6.6	21.7	0.0	4.5	1.1	3.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THIS YEAR WE ACHIEVED THE GREATEST POWER PRODUCTION IN OUR LIFETIME

5. Historical Summary

Date of Construction Start: 05 Jan 1971 **Lifetime Generation:** 65002.0 GW(e).h
Date of First Criticality: 13/03/1982 **Cumulative Energy Availability Factor:** 54.4%
Date of Grid Connection: 04 Jan 1982 **Cumulative Load Factor:** 45.1%
Date of Commercial Operation: 01 Jan 1985 **Cumulative Unit Capability Factor:** 61.2%
Cumulative Energy Unavailability Factor: 45.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	3169.4	626	57.8	57.8	57.8	57.8	57.8	57.8	6847	78.2
1986	132.4	626	3.7	30.7	3.7	30.7	2.4	30.1	512	5.8
1987	910.6	626	19.7	27.1	19.7	27.1	16.6	25.6	1958	22.4
1988	566.6	626	18.5	24.9	18.5	24.9	10.3	21.8	1488	16.9
1989	1695.1	626	61.8	32.3	61.3	32.2	30.9	23.6	5362	61.2
1990	2055.3	626	86.1	41.3	82.5	40.6	37.5	25.9	7400	84.5
1991	1306.4	626	57.2	43.5	57.2	43.0	23.8	25.6	5046	57.6
1992	1506.4	626	47.9	44.1	47.9	43.6	27.4	25.8	4275	48.7
1993	402.7	626	17.2	41.1	17.2	40.6	7.3	23.8	1524	17.4
1994	41.5	626	83.8	45.4	3.5	36.9	0.8	21.5	305	3.5
1995	2333.6	626	92.8	49.7	42.6	37.4	42.6	23.4	8127	92.8
1996	2288.8	626	67.0	51.1	55.2	38.9	41.6	24.9	5063	57.6
1997	2990.0	626	60.7	51.9	53.2	40.0	54.5	27.2	6219	71.0
1998	3093.8	626	56.4	52.2	56.4	41.2	56.4	29.3	6976	79.6
1999	3631.7	626	65.2	53.0	64.8	42.8	66.2	31.7	8429	96.2
2000	3164.9	626	58.7	53.4	58.7	43.8	57.6	33.4	6514	74.2
2001	3614.4	626	82.9	55.1	82.9	46.1	65.9	35.3	7295	83.3
2002	3775.2	626	87.7	56.9	85.9	48.3	68.8	37.1	7595	86.7
2003	3137.1	626	74.5	57.9	57.2	48.7	57.2	38.2	6551	74.8
2004	3890.2	626	70.7	58.5	70.7	49.8	70.7	39.8	7968	90.7
2005	3520.4	626	83.0	59.7	83.0	51.4	64.2	41.0	7275	83.0
2006	3205.2	626	64.0	59.9	64.0	52.0	58.4	41.8	6743	77.0
2007	2553.5	520	62.8	60.0	62.8	52.4	56.1	42.3	5481	62.6
2008	3314.5	491	78.6	60.6	78.6	53.3	76.9	43.4	6967	79.3
2009	2668.9	609	57.4	60.5	57.4	53.4	50.9	43.7	5256	60.0
2010	4201.3	609	79.0	61.2	79.0	54.4	78.8	45.1	7040	80.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		179			1408	0
B. Refuelling without a maintenance				35	4	
C. Inspection, maintenance or repair combined with refuelling	844			977		
D. Inspection, maintenance or repair without refuelling	677			223	10	
E. Testing of plant systems or components				64	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				109		
H. Nuclear regulatory requirements				50	0	10
J. Grid limitation, failure or grid unavailability					4	3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	11
L. Human factor related					0	284
Subtotal	1521	179	0	1458	1449	308
Total		1700			3215	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems	10	47
13. Reactor Auxiliary Systems		86
15. Reactor Cooling Systems		15
16. Steam generation systems	30	38
21. Fuel Handling and Storage Facilities		297
31. Turbine and auxiliaries	30	108
32. Feedwater and Main Steam System		53
33. Circulating Water System		8
41. Main Generator Systems	109	465
42. Electrical Power Supply Systems		235
Total	179	1352

BR-2 ANGRA-2

Operator: ELETRONU (ELETROBRAS ELETRONUCLEAR S.A.)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1275.0 MW(e)
 Design Net Capacity: 1245.0 MW(e)
 Design Discharge Burnup: 35000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9697.4 GW(e).h
 Energy Availability Factor: 87.1%
 Load Factor: 86.8%
 Operating Factor: 88.2%
 Energy Unavailability Factor: 12.9%
 Total Off-line Time: 1033 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	943.4	823.6	948.3	786.9	784.4	920.2	951.9	952.4	920.1	856.8	0.0	809.4	9697.4
EAF (%)	100.0	100.0	100.0	86.2	82.6	100.0	100.0	100.0	100.0	90.3	0.0	85.3	87.1
UCF (%)	100.0	100.0	100.0	86.2	82.6	100.0	100.0	100.0	100.0	90.3	0.0	85.3	87.1
LF (%)	99.4	96.1	100.0	85.7	82.7	100.2	100.4	100.4	100.2	90.3	0.0	85.3	86.8
OF (%)	100.0	100.0	100.0	86.3	83.3	100.0	100.0	100.0	100.0	100.0	0.0	87.9	88.2
EUf (%)	0.0	0.0	0.0	13.8	17.4	0.0	0.0	0.0	0.0	9.7	100.0	14.7	12.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	100.0	14.7	10.3
UCLF (%)	0.0	0.0	0.0	13.8	17.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

ON 26/04/2010 AT 21:09H PLANT WAS SHUTDOWN FROM THE NATIONAL POWER SYSTEM AND THE REACTOR MANUAL SCRAM AT 21:35 IN RESPONSE TO ITEM 16.3.8.1 TECHNICAL SPECIFICATIONS DUE TO THE IMPOSSIBILITY FOR MORE THAN 14 DAYS GENERATOR DIESEL EMERGENCY 7XJXK.

5. Historical Summary

Date of Construction Start: 01 Jan 1976
 Date of First Criticality: 14/07/2000
 Date of Grid Connection: 21/07/2000
 Date of Commercial Operation: 02 Jan 2001

Lifetime Generation: 91601.2 GW(e).h
 Cumulative Energy Availability Factor: 84.0%
 Cumulative Load Factor: 79.5%
 Cumulative Unit Capability Factor: 85.8%
 Cumulative Energy Unavailability Factor: 16.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2001	9272.9	1350	94.3	94.3	94.2	94.2	85.7	85.7	7797	97.3
2002	9238.2	1275	91.3	92.8	83.3	88.7	82.7	84.2	8060	92.0
2003	9419.0	1275	91.0	92.2	84.3	87.2	84.3	84.2	8019	91.5
2004	6919.8	1275	72.8	87.3	72.8	83.6	61.8	78.6	6497	74.0
2005	5676.7	1275	63.7	82.5	63.7	79.6	50.8	73.0	5581	63.7
2006	9778.3	1275	89.3	83.7	89.3	81.2	87.5	75.4	8014	91.5
2007	9096.9	1275	85.9	84.0	84.7	81.7	81.4	76.3	7606	86.8
2008	9894.0	1275	90.1	84.8	89.1	82.6	88.3	77.8	7924	90.2
2009	9554.7	1275	92.4	85.6	91.7	83.6	85.5	78.7	8068	92.1
2010	9697.4	1275	87.1	85.8	87.1	84.0	86.8	79.5	7727	88.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		235			256	
C. Inspection, maintenance or repair combined with refuelling	830			447	48	
D. Inspection, maintenance or repair without refuelling				297		
E. Testing of plant systems or components				5		
J. Grid limitation, failure or grid unavailability						5
Subtotal	830	235	0	749	304	5
Total		1065			1058	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		56
15. Reactor Cooling Systems		29
16. Steam generation systems		0
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		1
41. Main Generator Systems		90
42. Electrical Power Supply Systems	235	69
Total	235	253

BG-5 KOZLODUY-5

Operator: KOZNPP (KOZLODUY NPP-plc)
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 953.0 MW(e)
Design Net Capacity: 953.0 MW(e)
Design Discharge Burnup: 27000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7293.3 GW(e).h
Energy Availability Factor: 85.9%
Load Factor: 87.4%
Operating Factor: 87.0%
Energy Unavailability Factor: 14.1%
Total Off-line Time: 1139 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	714,7	626,2	715,0	580,9	0,0	397,8	713,8	708,1	692,0	717,2	700,1	727,6	7293,3
EAF (%)	98,6	97,1	99,5	83,0	0,0	57,7	99,6	99,1	99,1	98,8	99,2	99,7	85,9
UCF (%)	99,9	97,4	100,0	83,3	0,0	57,9	99,9	99,4	100,0	100,0	100,0	100,0	86,4
LF (%)	100,8	97,8	101,0	84,7	0,0	58,0	100,7	99,9	100,8	101,2	102,0	102,6	87,4
OF (%)	100,0	100,0	100,0	83,6	0,0	61,5	100,0	100,0	100,0	100,0	100,0	100,0	87,0
EUUF (%)	1,4	2,9	0,5	17,0	100,0	42,3	0,4	0,9	0,9	1,2	0,8	0,3	14,1
PUF (%)	0,0	0,0	0,0	16,7	100,0	40,2	0,0	0,0	0,0	0,0	0,0	0,0	13,2
UCLF (%)	0,1	2,6	0,0	0,0	0,0	1,9	0,1	0,6	0,0	0,0	0,0	0,0	0,4
XUF (%)	1,3	0,3	0,5	0,3	0,0	0,2	0,3	0,3	0,9	1,2	0,8	0,3	0,5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT 5 WAS OPERATED AT BASE LOAD MODE IN ACCORDANCE WITH THE LOAD SCHEDULE AGREED BY TSO (TRANSMISSION SYSTEM OPERATOR). THE PLANNED OUTAGE FOR ANNUAL MAINTENANCE ACTIVITIES, REFUELLING AND MODERNIZATION WAS PERFORMED IN THE PERIOD 26TH APRIL - 11 TH JUNE. THE MOST IMPORTANT MODERNIZATION PROJECT IMPLEMENTED DURING THE PLANNED OUTAGE IS RELATED TO THE SAFETY CONTROL SYSTEM UPGRADING - IT WAS REPLACED THE EQUIPMENT OF TWO SCS CHANNELS. THE TOTAL DURATION OF THE UNIT PLANNED OUTAGE WAS 47 DAYS.

5. Historical Summary

Date of Construction Start: 07 Sep 1980 **Lifetime Generation:** 104972.0 GW(e).h
Date of First Criticality: 11 Mai 1987 **Cumulative Energy Availability Factor:** 65.9%
Date of Grid Connection: 29/11/1987 **Cumulative Load Factor:** 56.8%
Date of Commercial Operation: 23/12/1988 **Cumulative Unit Capability Factor:** 68.7%
Cumulative Energy Unavailability Factor: 34.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	635,9	887	100,0	100,0	100,0	100,0	96,4	96,4	744	100,0
1989	3355,1	953	51,5	55,1	51,5	55,1	40,2	44,3	4663	53,2
1990	3380,9	953	58,1	56,5	41,8	48,7	40,5	42,5	5592	63,8
1991	1950,4	953	31,7	48,5	31,7	43,2	23,4	36,3	2777	31,7
1992	3540,7	953	56,7	50,5	47,0	44,1	42,3	37,7	4982	56,7
1993	3278,0	953	50,5	50,5	47,5	44,8	39,3	38,0	4675	53,4
1994	2880,4	953	52,6	50,8	48,1	45,3	34,5	37,5	4350	49,7
1995	4699,3	953	68,1	53,3	59,4	47,3	56,3	40,1	5988	68,4
1996	4720,3	953	73,8	55,8	73,8	50,6	56,4	42,1	6468	73,6
1997	4410,2	953	68,7	57,2	68,7	52,6	52,8	43,3	6034	68,9
1998	3741,0	953	73,3	58,8	73,3	54,6	44,8	43,5	6467	73,8
1999	3423,2	953	54,8	58,5	50,4	54,3	41,0	43,2	4838	55,2
2000	4340,8	1000	63,5	58,9	54,4	54,3	49,4	43,8	5406	61,5
2001	5049,6	953	66,6	59,5	61,5	54,8	60,5	45,0	5940	67,8
2002	5095,8	953	79,8	60,9	79,4	56,6	61,0	46,2	7003	79,9
2003	5596,7	953	98,6	63,4	98,6	59,3	67,0	47,6	8579	97,9
2004	4842,0	953	67,2	63,7	67,2	59,8	57,8	48,2	5906	67,2
2005	5513,5	953	75,2	64,3	75,2	60,7	66,0	49,2	6641	75,8
2006	6047,0	953	75,8	65,0	75,7	61,6	72,4	50,5	6691	76,4
2007	6669,9	953	80,4	65,8	80,2	62,5	79,9	52,1	7090	80,9
2008	7341,3	953	88,4	66,9	87,9	63,8	87,7	53,8	7796	88,8
2009	7181,5	953	88,3	67,9	87,7	64,9	86,0	55,4	7759	88,6
2010	7293,3	953	86,4	68,7	85,9	65,9	87,4	56,8	7620	87,0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					166	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	1139			1582		
D. Inspection, maintenance or repair without refuelling				190		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				106		
H. Nuclear regulatory requirements				27		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Subtotal	1139	0	0	1905	168	2
Total		1139			2075	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		9
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		8
16. Steam generation systems		10
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		16
35. All other I&C Systems		2
41. Main Generator Systems		97
42. Electrical Power Supply Systems		2
Total	0	162

BG-6 KOZLODUY-6

Operator: KOZNPP (KOZLODUY NPP-plc)
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 953.0 MW(e)
Design Net Capacity: 953.0 MW(e)
Design Discharge Burnup: 27000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6943.1 GW(e).h
Energy Availability Factor: 82.7%
Load Factor: 83.2%
Operating Factor: 84.3%
Energy Unavailability Factor: 17.3%
Total Off-line Time: 1373 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	537,2	656,5	689,3	624,8	714,1	687,0	710,8	697,2	335,4	0,0	563,8	727,2	6943,1
EAF (%)	74,4	99,7	94,8	99,3	98,9	98,9	99,7	98,5	48,9	0,0	81,3	99,7	82,7
UCF (%)	74,7	100,0	95,1	100,0	100,0	100,0	100,0	99,1	55,8	0,0	81,5	100,0	83,7
LF (%)	75,8	102,5	97,3	91,1	100,7	100,1	100,2	98,3	48,9	0,0	82,2	102,6	83,2
OF (%)	75,9	100,0	95,8	100,0	100,0	100,0	100,0	100,0	56,9	0,0	85,0	100,0	84,3
EUF (%)	25,6	0,3	5,2	0,7	1,1	1,1	0,3	1,5	51,1	100,0	18,7	0,3	17,3
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,9	44,2	96,4	3,5	0,0	12,2
UCLF (%)	25,3	0,0	4,9	0,0	0,0	0,0	0,0	0,0	0,0	3,6	15,0	0,0	4,1
XUF (%)	0,3	0,3	0,3	0,7	1,1	1,1	0,3	0,7	6,9	0,0	0,3	0,3	1,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT 6 WAS OPERATED AT BASE LOAD MODE IN ACCORDANCE WITH THE LOAD SCHEDULE AGREED BY TSO. THE UNIT WAS OPERATED AT FUEL COAST DOWN MODE IN THE PERIOD 28TH AUGUST - 17 TH SEPTEMBER. THE PLANNED OUTAGE FOR ANNUAL MAINTENANCE ACTIVITIES, REFUELING AND MODERNIZATION WAS PERFORMED IN THE PERIOD 18TH SEPTEMBER - 30 TH OCTOBER. THE MOST IMPORTANT MODERNIZATION PROJECT IMPLEMENTED DURING THE PLANNED OUTAGE IS A REPLACEMENT OF THE SG FEED WATER HIGH PRESSURE REHEATERS. BECAUSE OF PROBLEM WITH THE CONTROL RODS DRIVE MECHANISMS PROTECTIVE PIPES THE PLANNED OUTAGE WAS EXTENDED FOR ITS REPLACEMENT. THE TOTAL DURATION OF THE UNIT OUTAGE WAS 49 DAYS. TWO UNPLANNED TG OUTAGE WERE OCCURRED (IN JANUARY AND IN MARCH). DURING THE TRANSIENTS AFTER TG TRIP IN MARCH THE REACTOR SCRAM WAS ACTIVATED AUTOMATICALLY. THE LAST REACTOR SCRAM WAS OCCURRED ON 22TH DECEMBER, 1996.

5. Historical Summary

Date of Construction Start: 04 Jän 1982 Lifetime Generation: 92263.0 GW(e).h
Date of First Criticality: 29/05/1991 Cumulative Energy Availability Factor: 73.0%
Date of Grid Connection: 08 Feb 1991 Cumulative Load Factor: 64.5%
Date of Commercial Operation: 30/12/1993 Cumulative Unit Capability Factor: 75.4%
Cumulative Energy Unavailability Factor: 27.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	59,9	953	91,2	91,2	91,2	91,2	8,4	8,4	678	91,1
1994	4862,6	953	88,7	88,9	87,6	87,9	58,2	54,3	7817	89,2
1995	3831,9	953	63,6	76,8	63,6	76,2	45,9	50,3	5568	63,6
1996	5495,9	953	76,2	76,6	76,2	76,2	65,7	55,3	6698	76,3
1997	4825,4	953	72,8	75,7	72,8	75,4	57,8	55,9	6380	72,8
1998	3970,0	953	63,7	73,3	63,7	73,1	47,6	54,3	6079	69,4
1999	4407,8	953	69,6	72,7	60,7	71,1	52,8	54,0	6194	70,7
2000	4064,3	1000	66,8	71,8	51,2	68,1	46,3	52,9	5772	65,7
2001	4189,4	953	63,4	70,8	50,4	66,0	50,2	52,5	5441	62,1
2002	5324,9	953	71,5	70,9	71,5	66,6	63,8	53,8	6256	71,4
2003	5480,6	953	72,9	71,1	72,9	67,2	65,6	54,9	6474	73,9
2004	5298,1	953	75,3	71,4	75,2	67,9	63,3	55,7	6614	75,3
2005	6150,0	953	77,0	71,9	76,9	68,7	73,7	57,2	6772	77,3
2006	5917,3	953	77,1	72,3	77,0	69,3	70,9	58,2	6821	77,9
2007	7024,8	953	85,0	73,2	84,7	70,4	84,1	60,1	7493	85,5
2008	7400,2	953	88,1	74,2	87,2	71,5	88,4	61,9	7753	88,3
2009	7037,4	953	86,2	74,9	85,6	72,4	84,3	63,3	7562	86,3
2010	6943,1	953	83,7	75,4	82,7	73,0	83,2	64,5	7387	84,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1992 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		344			176	
C. Inspection, maintenance or repair combined with refuelling	1028			1469		
D. Inspection, maintenance or repair without refuelling				119		
E. Testing of plant systems or components				9	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				114		
J. Grid limitation, failure or grid unavailability						4
Subtotal	1028	344	0	1711	176	4
Total		344			1891	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1992 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems	134	5
14. Safety Systems		27
31. Turbine and auxiliaries	210	0
32. Feedwater and Main Steam System		1
41. Main Generator Systems		8
42. Electrical Power Supply Systems		133
Total	344	174

CA-10 BRUCE-3

Operator: BRUCEPOW (BRUCE POWER)
Contractor: NEI.P (NEI PARSONS)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 730.0 MW(e)
Design Net Capacity: 750.0 MW(e)
Design Discharge Burnup: 8750 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4375.8 GW(e).h
Energy Availability Factor: 68.4%
Load Factor: 68.4%
Operating Factor: 70.8%
Energy Unavailability Factor: 31.6%
Total Off-line Time: 2562 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	329,9	420,4	-1,4	71,5	261,5	385,9	533,3	486,3	462,5	540,9	341,9	543,1	4375,8
EAF (%)	60,4	85,3	0,0	12,2	48,7	73,0	98,6	89,5	89,1	99,6	65,3	100,0	68,4
UCF (%)	60,5	85,3	0,0	12,3	48,8	73,5	100,0	100,0	89,7	100,0	65,5	100,0	69,6
LF (%)	60,7	85,7	-0,3	13,6	48,1	73,4	98,2	89,5	88,0	99,6	65,0	100,0	68,4
OF (%)	63,8	85,6	0,0	17,1	48,9	77,4	100,0	93,1	91,0	100,0	72,8	100,0	70,8
EUF (%)	39,6	14,7	100,0	87,8	51,3	27,0	1,4	10,5	10,9	0,4	34,7	0,0	31,6
PUF (%)	0,0	14,7	100,0	87,7	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	16,8
UCLF (%)	39,6	0,0	0,0	0,0	51,3	26,5	0,0	0,0	10,3	0,0	34,4	0,0	13,6
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,4	1,4	10,5	0,6	0,4	0,2	0,0	1,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT EXPERIENCED A NUMBER OF FORCED OUTAGES. IN JANUARY THE UNIT WAS TAKEN OFF LINE TO REPAIR ECI INTERGATE LINES. IN MAY THE UNIT WAS FORCED OFF LINE DUE TO A MODERATOR CONTROL ISSUE. JUNE THE UNIT REDUCED POWER BECAUSE THE CONDENSATE EXTRACTION PUMP OUT OF SERVICE. IN SEPTEMBER, THE UNIT WAS FORCED FROM SERVICE DUE TO LIQUID ZONE CONTROL ISSUES. END OF FEBRUARY TO APRIL THE UNIT WAS IN A PLANNED OUTAGE FOR 60 DAYS TO COMPLETE THE LAST ROUND OF WESTSHIFT. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 07 Jän 1972 Lifetime Generation: 124922.4 GW(e).h
Date of First Criticality: 28/11/1977 Cumulative Energy Availability Factor: 73.1%
Date of Grid Connection: 12 Dez 1977 Cumulative Load Factor: 73.0%
Date of Commercial Operation: 02 Jän 1978 Cumulative Unit Capability Factor: 73.8%
Cumulative Energy Unavailability Factor: 26.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	4793,0	740	87,6	87,6	87,6	87,6	82,0	82,0	7361	93,2
1979	4797,9	740	77,8	82,4	77,8	82,4	73,2	77,4	6885	77,7
1980	5939,8	740	91,4	85,5	91,4	85,5	91,4	82,2	8276	94,2
1981	5795,0	740	89,5	86,5	89,5	86,5	89,4	84,0	7873	89,9
1982	6381,9	740	96,7	88,6	96,7	88,6	98,4	87,0	8497	97,0
1983	6091,1	740	89,2	88,7	89,2	88,7	94,0	88,1	7905	90,2
1984	6148,7	740	91,2	89,1	91,2	89,1	94,6	89,1	8077	92,0
1985	6015,1	775	93,9	89,7	88,6	89,0	88,6	89,0	8118	92,7
1986	5891,2	796	86,9	89,4	84,2	88,4	84,5	88,5	7600	86,8
1987	6073,3	848	85,8	89,0	81,9	87,7	81,8	87,7	7724	88,2
1988	3310,6	848	45,6	84,6	45,6	83,4	44,4	83,3	4044	46,0
1989	4031,7	848	57,4	82,1	54,8	80,8	54,3	80,7	5364	61,2
1990	5652,7	848	76,8	81,6	76,3	80,4	76,1	80,3	7472	85,3
1991	6126,3	848	84,3	81,8	82,4	80,6	82,5	80,5	7950	90,8
1992	5801,0	848	77,9	81,6	77,9	80,4	77,9	80,3	7438	84,7
1993	3158,2	848	43,0	79,0	43,0	77,9	42,5	77,7	6557	74,9
1994	2737,6	848	36,9	76,3	36,9	75,3	36,9	75,2	5006	57,1
1995	4225,8	848	56,9	75,2	56,9	74,2	56,9	74,1	7000	79,9
1996	3321,5	848	44,6	73,5	44,6	72,5	44,6	72,4	5684	64,7
1997	4214,8	848	56,8	72,6	56,8	71,7	56,7	71,6	6325	72,2
1998	1642,5	848	81,6	72,7	81,6	71,8	81,6	71,7	2328	98,1
1999	Data not available - Long-term shutdown									
2000	"									
2001	"									
2002	"									
2003	"									
2004	4971,6	750	76,5	72,9	76,1	72,0	75,3	71,9	7154	81,4
2005	4938,1	750	75,5	73,0	75,2	72,2	75,2	72,0	6782	77,4
2006	5440,2	750	83,3	73,4	82,9	72,6	82,8	72,5	7435	84,9
2007	4966,7	750	76,7	73,5	76,0	72,7	75,6	72,6	6911	78,9
2008	5148,9	734	79,8	73,8	79,3	73,0	79,9	72,9	7125	81,1
2009	5162,1	730	80,6	74,0	80,4	73,2	80,7	73,1	7148	81,6
2010	4375,8	730	69,6	73,8	68,4	73,1	68,4	73,0	6198	70,8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1097			612	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling				24	0	
D. Inspection, maintenance or repair without refuelling	1438			627	1	
E. Testing of plant systems or components				16	1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	14
L. Human factor related					4	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			51			
Subtotal	1438	1097	51	667	625	14
Total		2586			1306	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	545	64
12. Reactor I&C Systems	66	46
13. Reactor Auxiliary Systems		27
14. Safety Systems		65
15. Reactor Cooling Systems	290	63
16. Steam generation systems		113
31. Turbine and auxiliaries		102
32. Feedwater and Main Steam System		33
33. Circulating Water System		1
35. All other I&C Systems		6
41. Main Generator Systems	196	65
42. Electrical Power Supply Systems		7
XX. Miscellaneous Systems		1
Total	1097	593

2010 Operating Experience

CA-11 BRUCE-4

Operator: BRUCEPOW (BRUCE POWER)

Contractor: NEI.P (NEI PARSONS)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUF at the beginning of 2010): 730.0 MW(e)
Design Net Capacity: 750.0 MW(e)
Design Discharge Burnup: 8750 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5976.2 GW(e).h
Energy Availability Factor: 94.1%
Load Factor: 93.5%
Operating Factor: 95.4%
Energy Unavailability Factor: 5.9%
Total Off-line Time: 400 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	259.1	486.9	542.1	524.4	541.8	519.8	529.8	519.5	465.8	533.5	517.3	536.2	5976.2
EAF (%)	47,8	99,5	99,9	99,9	99,9	99,5	98,5	96,6	89,7	99,6	99,5	99,6	94,1
UCF (%)	47,8	99,5	99,9	99,9	100,0	100,0	99,9	97,7	90,5	100,0	99,8	99,6	94,5
LF (%)	47,7	99,3	99,8	99,8	99,8	98,9	97,5	95,6	88,6	98,2	98,4	98,7	93,5
OF (%)	53,1	100,0	100,0	100,0	100,0	100,0	100,0	100,0	92,9	100,0	100,0	100,0	95,4
EUf (%)	52,2	0,5	0,1	0,1	0,1	0,5	1,5	3,4	10,3	0,4	0,5	0,4	5,9
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0
UCLF (%)	52,2	0,4	0,1	0,0	0,0	0,0	0,1	2,3	9,5	0,0	0,1	0,4	5,5
XUF (%)	0,0	0,0	0,0	0,0	0,1	0,4	1,4	1,1	0,8	0,4	0,2	0,0	0,4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

AT THE BEGINNING OF THE YEAR THE UNIT WAS FORCED TO REDUCE POWER BECAUSE OF A FUEL DEFICIT. MID-JANUARY THE UNIT CAME OFFLINE DUE TO A SHUTDOWN SYSTEM TRIP. THE FORCED OUTAGE WAS EXTENDED TO EXECUTE REPAIRS TO THE ECI INTEGRATE LINES. IN SEPTEMBER THE UNIT WAS FORCED TO REDUCE POWER DUE TO HIGH MODERATOR OUTFLOW TEMPERATURE AND THEN AGAIN DUE TO GOVERNOR VALVE LIMITATION DURING OSCILLATIONS. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 09 Jan 1972 **Lifetime Generation:** 120805.7 GW(e).h
Date of First Criticality: 12 Okt 1978 **Cumulative Energy Availability Factor:** 72.0%
Date of Grid Connection: 21/12/1978 **Cumulative Load Factor:** 71.6%
Date of Commercial Operation: 18/01/1979 **Cumulative Unit Capability Factor:** 72.9%
Cumulative Energy Unavailability Factor: 28.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							Annual Time Online	
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Hours	OF [%]	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.			
1979	4966.4	740	84.8	84.8	84.8	84.8	80.4	80.4	7084	84.8	
1980	4945.1	740	76.1	80.4	76.1	80.4	76.1	78.2	6962	79.3	
1981	5753.5	740	89.1	83.3	89.1	83.3	88.8	81.7	7874	89.9	
1982	6050.2	740	92.2	85.6	92.2	85.6	93.3	84.7	8150	93.0	
1983	6407.4	740	94.3	87.3	94.3	87.3	98.8	87.5	8345	95.3	
1984	6664.6	740	97.8	89.1	97.8	89.1	102.5	90.1	8625	98.2	
1985	4995.2	788	79.0	87.6	73.2	86.7	72.3	87.4	6518	74.4	
1986	6891.6	848	95.5	88.7	92.8	87.5	92.8	88.1	8644	98.7	
1987	5045.0	848	71.5	86.6	67.9	85.1	67.9	85.6	6366	72.7	
1988	4663.7	848	66.9	84.4	65.7	83.0	62.6	83.1	5997	68.3	
1989	5584.2	848	77.0	83.7	75.3	82.2	75.2	82.3	7290	83.2	
1990	3533.0	848	48.3	80.5	47.5	79.1	47.6	79.2	4611	52.6	
1991	5940.7	848	81.6	80.6	79.9	79.2	80.0	79.3	7955	90.8	
1992	5843.4	848	80.1	80.6	78.4	79.1	78.4	79.2	8070	91.9	
1993	350.1	848	4.7	75.2	4.7	73.9	4.7	73.9	527	6.0	
1994	3656.0	848	49.3	73.5	49.3	72.2	49.2	72.3	7206	82.3	
1995	3034.9	848	40.9	71.5	40.9	70.3	40.9	70.4	5024	57.4	
1996	5296.3	848	71.2	71.4	71.2	70.3	71.1	70.4	8686	98.9	
1997	2923.0	848	39.4	69.7	39.4	68.6	39.3	68.7	4968	56.7	
1998	12.3	848	0.8	68.9	0.8	67.9	0.8	67.9	45	2.5	
1999	Data not available - Long-term shutdown										
2000	"										
2001	"										
2002	"										
2003	934.5	769	100.0	69.3	100.0	68.3	55.0	67.8	802	36.3	
2004	5418.8	769	83.4	69.9	83.4	69.0	82.1	68.4	7469	85.0	
2005	5499.1	750	84.1	70.5	83.7	69.6	83.7	69.1	7469	85.3	
2006	5308.2	750	81.6	71.0	80.8	70.1	80.8	69.6	7261	82.9	
2007	5251.0	750	80.8	71.4	80.1	70.5	79.9	70.0	7298	83.3	
2008	5504.4	734	85.6	71.9	84.9	71.0	85.4	70.6	7603	86.6	
2009	4907.6	730	77.4	72.1	76.9	71.2	76.7	70.8	7014	80.1	
2010	5976.2	730	94.5	72.9	94.1	72.0	93.5	71.6	8360	95.4	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		420			727	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling				71		
D. Inspection, maintenance or repair without refuelling				594		
E. Testing of plant systems or components				47		
H. Nuclear regulatory requirements					6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					13	21
L. Human factor related					4	
Subtotal	0	420	0	712	754	21
Total		420			1487	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1979 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		106
12. Reactor I&C Systems		36
14. Safety Systems	420	26
15. Reactor Cooling Systems		67
16. Steam generation systems		187
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries		49
32. Feedwater and Main Steam System		37
35. All other I&C Systems		108
41. Main Generator Systems		22
42. Electrical Power Supply Systems		25
XX. Miscellaneous Systems		16
Total	420	682

CA-18 BRUCE-5

Operator: BRUCEPOW (BRUCE POWER)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 817.0 MW(e)
 Design Net Capacity: 822.0 MW(e)
 Design Discharge Burnup: 7710 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6699.7 GW(e).h
 Energy Availability Factor: 94.0%
 Load Factor: 93.6%
 Operating Factor: 95.5%
 Energy Unavailability Factor: 6.0%
 Total Off-line Time: 392 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	607,8	544,3	603,9	579,3	607,8	555,0	563,8	590,4	583,0	426,1	432,3	606,0	6699,7
EAF (%)	99,6	98,8	99,7	100,0	99,9	94,2	93,3	97,8	99,6	70,5	74,6	99,7	94,0
UCF (%)	99,6	98,8	99,7	100,0	99,9	94,3	93,9	98,7	100,0	70,6	74,6	99,9	94,2
LF (%)	100,0	99,1	99,3	98,5	100,0	94,3	92,7	97,1	99,1	70,1	73,5	99,7	93,6
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	70,6	76,0	100,0	95,5
EUF (%)	0,4	1,2	0,3	0,0	0,1	5,8	6,7	2,2	0,4	29,5	25,4	0,3	6,0
PUF (%)	0,0	1,0	0,2	0,0	0,0	0,0	0,0	0,4	0,0	29,4	25,4	0,0	4,7
UCLF (%)	0,4	0,2	0,1	0,0	0,1	5,7	6,1	0,9	0,0	0,0	0,1	0,1	1,1
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,1	0,6	0,8	0,4	0,0	0,0	0,3	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT EXPERIENCE A GRID RELATED LOSS IN MARCH AND IN APRIL. APRIL ALSO EXPERIENCED POWER LOSSES DUE TO DERATES BECAUSE OF LACK OF DEMAND IN THE PROVINCE. IN JUNE POWER WAS REDUCED BECAUSE OF FUEL MACHINE UNAVAILABILITY. OCTOBER AND NOVEMBER THE UNIT HAD A PLANNED OUTAGE FOR REGULAR MAINTENANCE. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 06 Jan 1978 Lifetime Generation: 156703.9 GW(e).h
 Date of First Criticality: 15/11/1984 Cumulative Energy Availability Factor: 84.3%
 Date of Grid Connection: 12 Feb 1984 Cumulative Load Factor: 84.1%
 Date of Commercial Operation: 03 Jan 1985 Cumulative Unit Capability Factor: 84.9%
 Cumulative Energy Unavailability Factor: 15.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	4992,2	805	91,6	91,6	85,9	85,9	84,2	84,2	6324	86,1
1986	7078,0	835	98,4	95,4	96,7	91,8	96,8	91,2	8675	99,0
1987	5730,1	835	80,2	90,0	78,2	87,0	78,3	86,6	7197	82,2
1988	6673,6	860	88,5	89,6	88,5	87,4	88,3	87,1	7824	89,1
1989	7130,8	860	97,1	91,2	94,1	88,8	94,7	88,7	8589	98,0
1990	5534,7	860	74,6	88,3	73,5	86,1	73,5	86,0	6656	76,0
1991	6769,6	860	90,7	88,6	90,3	86,8	89,9	86,6	8130	92,8
1992	6452,1	860	85,8	88,3	85,8	86,6	85,4	86,4	7636	86,9
1993	5118,3	860	68,1	86,0	68,1	84,5	67,9	84,3	7457	85,1
1994	5629,3	860	75,0	84,8	75,0	83,5	74,7	83,3	7671	87,6
1995	6125,3	860	81,4	84,5	81,4	83,3	81,3	83,1	7859	89,7
1996	5767,6	860	76,4	83,8	76,4	82,7	76,3	82,6	7153	81,4
1997	6388,3	860	84,8	83,9	84,8	82,9	84,8	82,7	8148	93,0
1998	5623,1	785	81,7	83,7	81,7	82,8	81,8	82,7	7305	83,4
1999	5281,9	785	76,6	83,3	76,6	82,4	76,8	82,3	6719	76,7
2000	6908,7	785	99,1	84,2	99,1	83,4	100,2	83,4	8719	99,3
2001	4902,1	790	70,9	83,5	70,9	82,7	70,8	82,7	6220	71,0
2002	5993,1	790	86,3	83,6	86,3	82,9	86,6	82,9	7630	87,1
2003	5302,5	790	77,3	83,3	77,3	82,6	76,6	82,6	6783	77,4
2004	5889,1	790	85,1	83,4	85,1	82,7	84,9	82,7	7543	85,9
2005	5109,6	790	74,6	83,0	74,1	82,3	73,8	82,3	6678	76,2
2006	6723,5	806	97,2	83,6	96,8	83,0	95,9	82,9	8694	99,2
2007	6710,9	795	97,7	84,2	97,2	83,6	96,4	83,4	8760	100,0
2008	5597,0	817	78,3	84,0	78,0	83,4	78,0	83,2	6943	79,0
2009	6826,7	817	98,0	84,5	97,9	83,9	95,4	83,7	8597	98,1
2010	6699,7	817	94,2	84,9	94,0	84,3	93,6	84,1	8368	95,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					271	
D. Inspection, maintenance or repair without refuelling	392			704	9	
E. Testing of plant systems or components				7	0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	19
L. Human factor related					5	
Subtotal	392	0	0	711	290	19
Total		392			1020	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		31
13. Reactor Auxiliary Systems		11
14. Safety Systems		17
15. Reactor Cooling Systems		101
16. Steam generation systems		19
21. Fuel Handling and Storage Facilities		13
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System		25
33. Circulating Water System		2
41. Main Generator Systems		15
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems		2
Total	0	253

CA-19 BRUCE-6

Operator: BRUCEPOW (BRUCE POWER)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 817.0 MW(e)
 Design Net Capacity: 822.0 MW(e)
 Design Discharge Burnup: 7710 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5471.9 GW(e).h
 Energy Availability Factor: 76.5%
 Load Factor: 76.5%
 Operating Factor: 77.8%
 Energy Unavailability Factor: 23.5%
 Total Off-line Time: 1945 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	607,8	544,9	605,8	588,2	268,3	0,0	85,5	596,9	381,6	605,7	580,5	606,7	5471,9
EAF (%)	99,8	98,8	99,2	99,6	44,4	0,0	15,3	97,8	65,2	99,8	99,9	99,5	76,5
UCF (%)	99,8	98,8	99,2	99,6	44,4	0,0	15,4	98,7	65,6	99,8	99,9	99,6	76,7
LF (%)	100,0	99,2	99,7	100,0	44,1	0,0	14,1	98,2	64,9	99,7	98,7	99,8	76,5
OF (%)	100,0	100,0	100,0	100,0	46,2	0,0	21,4	100,0	66,9	100,0	99,7	100,0	77,8
EUF (%)	0,2	1,2	0,8	0,4	55,6	100,0	84,7	2,2	34,8	0,2	0,1	0,5	23,5
PUF (%)	0,0	0,0	0,0	0,0	55,4	100,0	25,6	0,0	0,2	0,0	0,0	0,0	15,1
UCLF (%)	0,2	1,2	0,8	0,4	0,2	0,0	59,1	1,3	34,2	0,2	0,1	0,4	8,2
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,9	0,4	0,0	0,0	0,1	0,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT HAD A PLANNED OUTAGE IN MAY THAT HAD AN UNPLANNED EXTENSION OF 18 DAYS. IN SEPTEMBER THERE WAS A FORCED OUTAGE DUE TO A PHT LEAK OUTSIDE OF CONTAINMENT. THE UNIT EXPERIENCED A GRID RELATED LOSS IN OCTOBER AND AGAIN IN NOVEMBER. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 01 Jan 1978 Lifetime Generation: 152587.1 GW(e).h
 Date of First Criticality: 29/05/1984 Cumulative Energy Availability Factor: 80.8%
 Date of Grid Connection: 26/06/1984 Cumulative Load Factor: 80.3%
 Date of Commercial Operation: 14/09/1984 Cumulative Unit Capability Factor: 81.6%
 Cumulative Energy Unavailability Factor: 19.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	2301,0	822	99,4	99,4	98,8	98,8	98,9	98,9	2926	99,9
1985	5900,1	805	88,7	91,3	84,0	87,7	83,7	87,4	7369	84,1
1986	5716,0	835	81,7	87,1	77,8	83,4	78,1	83,4	7213	82,3
1987	7017,1	837	97,9	90,4	95,3	87,0	95,7	87,1	8610	98,3
1988	6139,5	837	89,2	90,1	89,1	87,5	83,5	86,3	7880	89,7
1989	5386,2	837	78,9	88,0	73,4	84,8	73,5	83,8	7069	80,7
1990	6213,6	852	83,9	87,3	82,3	84,4	83,2	83,7	7429	84,8
1991	7013,4	860	93,3	88,2	93,0	85,6	93,1	85,1	8194	93,5
1992	5328,2	860	70,5	86,0	70,5	83,8	70,5	83,3	6393	72,8
1993	4351,0	860	58,0	82,9	58,0	81,0	57,8	80,5	6950	79,3
1994	6451,7	860	85,7	83,2	85,7	81,4	85,6	81,0	8760	100,0
1995	4671,6	860	62,1	81,3	62,1	79,7	62,0	79,3	6049	69,1
1996	6822,8	860	90,4	82,1	90,4	80,6	90,3	80,2	8682	98,8
1997	4796,4	860	63,7	80,7	63,7	79,3	63,7	78,9	6201	70,8
1998	4678,6	785	68,1	79,9	68,0	78,6	68,0	78,2	6137	70,1
1999	6860,1	785	99,4	81,0	99,3	79,8	99,8	79,5	8760	100,0
2000	4668,2	785	66,8	80,2	66,8	79,1	67,7	78,9	5912	67,3
2001	6840,1	790	98,3	81,2	98,3	80,1	98,8	79,9	8624	98,4
2002	3522,5	790	50,6	79,6	50,6	78,6	50,9	78,4	4539	51,8
2003	6750,9	790	98,2	80,5	98,2	79,6	97,6	79,4	8559	97,7
2004	5379,1	790	76,6	80,4	76,6	79,4	75,4	79,2	6698	76,3
2005	5721,1	841	79,6	80,3	79,6	79,4	78,9	79,2	7151	81,6
2006	7104,4	822	99,4	81,2	99,3	80,3	98,7	80,0	8760	100,0
2007	5145,0	822	71,8	80,8	71,8	79,9	71,5	79,7	6363	72,6
2008	6857,3	817	95,5	81,4	95,4	80,6	95,6	80,3	8452	96,2
2009	6063,1	817	91,4	81,8	91,3	81,0	84,7	80,5	7732	88,3
2010	5471,9	817	76,7	81,6	76,5	80,8	76,5	80,3	6815	77,8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		238			442	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1298					
D. Inspection, maintenance or repair without refuelling				764	2	
E. Testing of plant systems or components				0	3	
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					17	33
L. Human factor related		417			2	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					14	
Subtotal	1298	655	0	764	484	36
Total		1953			1284	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		95
12. Reactor I&C Systems		46
14. Safety Systems		27
15. Reactor Cooling Systems		120
16. Steam generation systems		75
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System		17
33. Circulating Water System		8
35. All other I&C Systems	238	
41. Main Generator Systems		4
42. Electrical Power Supply Systems		26
Total	238	432

CA-20 BRUCE-7

Operator: BRUCEPOW (BRUCE POWER)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 817.0 MW(e)
 Design Net Capacity: 822.0 MW(e)
 Design Discharge Burnup: 7710 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6726.6 GW(e).h
 Energy Availability Factor: 93.7%
 Load Factor: 94.0%
 Operating Factor: 98.3%
 Energy Unavailability Factor: 6.3%
 Total Off-line Time: 150 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	479,6	541,2	607,1	588,2	594,4	586,7	597,6	597,2	583,7	608,6	328,7	613,7	6726,6
EAF (%)	79,6	98,2	99,3	99,6	97,3	99,3	98,4	98,4	99,2	99,6	55,5	99,6	93,7
UCF (%)	79,6	98,2	99,3	99,6	97,3	99,4	98,9	99,2	99,6	99,6	55,5	99,6	93,8
LF (%)	78,9	98,6	99,9	100,0	97,8	99,7	98,3	98,2	99,2	100,1	55,9	101,0	94,0
OF (%)	79,8	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	98,3
EUUF (%)	20,4	1,8	0,7	0,4	2,7	0,7	1,6	1,6	0,8	0,4	44,5	0,4	6,3
PUF (%)	0,1	0,0	0,0	0,0	2,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2
UCLF (%)	20,3	1,8	0,7	0,4	0,5	0,7	1,1	0,8	0,4	0,4	44,5	0,4	6,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,1	0,6	0,8	0,4	0,0	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT EXPERIENCED A FORCED OUTAGE IN JANUARY FORCED OUTAGE DUE TO CORROSION ON CONDENSATE LINES. IN FEBRUARY TO MAY POWER WAS REDUCED FOR SECOND STAGE REHEAT AND IN MAY MAINTENANCE WAS EXECUTED. IN NOVEMBER POWER WAS REDUCED TO 40% FOR BOILER FEED PUMP REPAIRS. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 05 Jän 1979 Lifetime Generation: 150162.0 GW(e).h
 Date of First Criticality: 01 Jul 1986 Cumulative Energy Availability Factor: 84.7%
 Date of Grid Connection: 22/02/1986 Cumulative Load Factor: 84.0%
 Date of Commercial Operation: 04 Okt 1986 Cumulative Unit Capability Factor: 85.6%
 Cumulative Energy Unavailability Factor: 15.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	4952,8	838	96,7	96,7	89,8	89,8	89,7	89,7	6438	97,5
1987	6288,1	837	96,9	96,8	85,9	87,6	85,8	87,4	8489	96,9
1988	4866,2	846	74,8	88,7	74,8	82,9	65,4	79,4	6636	75,5
1989	7280,8	860	97,8	91,2	96,4	86,6	96,6	84,0	8632	98,5
1990	6659,4	860	90,7	91,1	88,5	87,0	88,4	85,0	8065	92,1
1991	5733,6	860	76,4	88,5	76,3	85,1	76,1	83,4	6835	78,0
1992	6413,4	860	85,2	88,0	85,1	85,1	84,9	83,6	7589	86,4
1993	5802,3	860	78,1	86,7	78,1	84,2	77,0	82,8	8760	100,0
1994	5496,7	860	73,2	85,2	73,2	82,9	73,0	81,7	7577	86,5
1995	6285,1	860	83,5	85,0	83,5	83,0	83,4	81,8	8092	92,4
1996	5475,7	860	72,6	83,8	72,5	82,0	72,5	81,0	7000	79,7
1997	6154,5	860	81,7	83,6	81,7	82,0	81,7	81,0	7874	89,9
1998	4990,8	785	72,4	82,8	72,4	81,3	72,6	80,4	6474	73,9
1999	6315,7	785	92,3	83,5	91,8	82,0	91,8	81,2	8208	93,7
2000	5322,7	785	78,2	83,1	76,9	81,7	77,2	80,9	6790	77,3
2001	7026,3	790	100,0	84,1	100,0	82,8	101,5	82,2	8760	100,0
2002	4819,4	790	69,5	83,3	69,5	82,0	69,6	81,5	6121	69,9
2003	6730,2	790	97,7	84,1	97,7	82,9	97,3	82,3	8592	98,1
2004	6428,8	790	92,8	84,5	92,8	83,4	92,6	82,8	8188	93,2
2005	4890,5	790	70,2	83,8	70,2	82,7	70,1	82,2	6310	72,0
2006	6740,5	806	95,1	84,4	94,8	83,3	94,4	82,8	8486	96,9
2007	6969,9	822	97,3	85,0	97,1	83,9	96,8	83,4	8570	97,8
2008	5763,7	817	80,1	84,7	79,9	83,7	80,3	83,3	7101	80,8
2009	6475,3	817	97,9	85,3	97,9	84,3	90,5	83,6	8144	93,0
2010	6726,6	817	93,8	85,6	93,7	84,7	94,0	84,0	8610	98,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		150			254	
B. Refuelling without a maintenance					1	
D. Inspection, maintenance or repair without refuelling				651	11	
E. Testing of plant systems or components				11		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	26
L. Human factor related					3	
Z. Others					9	
Subtotal	0	150	0	662	282	26
Total		150			970	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			2
12. Reactor I&C Systems			36
13. Reactor Auxiliary Systems			3
14. Safety Systems			2
15. Reactor Cooling Systems			55
16. Steam generation systems			22
21. Fuel Handling and Storage Facilities			6
31. Turbine and auxiliaries			12
32. Feedwater and Main Steam System	150		24
41. Main Generator Systems			8
42. Electrical Power Supply Systems			22
XX. Miscellaneous Systems			42
Total	150		234

CA-21 BRUCE-8**Operator:** BRUCEPOW (BRUCE POWER)**Contractor:** OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)**1. Station Details**

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 782.0 MW(e)
Design Net Capacity: 795.0 MW(e)
Design Discharge Burnup: 7710 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6930.2 GW(e).h
Energy Availability Factor: 98.6%
Load Factor: 101.2%
Operating Factor: 100.0%
Energy Unavailability Factor: 1.4%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	567,4	516,1	581,8	563,0	581,8	563,0	596,2	596,8	580,8	601,2	576,9	605,2	6930,2
EAF (%)	96,6	97,2	98,5	99,4	99,2	99,3	98,6	98,7	99,2	99,1	97,8	99,4	98,6
UCF (%)	96,6	97,2	98,5	99,4	99,2	99,3	99,2	99,6	99,6	99,1	97,8	99,4	98,8
LF (%)	97,5	98,2	100,0	100,0	100,0	100,0	102,5	102,6	103,2	103,3	102,5	104,0	101,2
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
EUF (%)	3,4	2,8	1,5	0,6	0,8	0,7	1,4	1,3	0,8	0,9	2,2	0,6	1,4
PUF (%)	2,7	2,2	0,9	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,0	0,0	0,5
UCLF (%)	0,8	0,6	0,6	0,6	0,8	0,7	0,8	0,4	0,4	0,7	2,2	0,6	0,8
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,1	0,6	0,9	0,4	0,0	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN JANUARY POWER WAS REDUCED ON THE UNIT FOR A CORE REORDER AND AGAIN IN FEBRUARY. PLANNED REPAIRS ON THE UNIT INCLUDED REPAIRS ON THE SEPARATOR DRAIN AND THE CONDENSER. IN ADDITION, THERE WERE POWER LOSSES FROM JUNE TO NOVEMBER DUE TO HIGHER THAN AVERAGE LAKE TEMPERATURES.

5. Historical Summary

Date of Construction Start: 08 Jan 1979 **Lifetime Generation:** 139193.7 GW(e).h
Date of First Criticality: 15/02/1987 **Cumulative Energy Availability Factor:** 82.8%
Date of Grid Connection: 03 Sep 1987 **Cumulative Load Factor:** 82.4%
Date of Commercial Operation: 22/05/1987 **Cumulative Unit Capability Factor:** 84.0%
Cumulative Energy Unavailability Factor: 17.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	3673,2	844	95,7	95,7	74,7	74,7	74,6	74,6	5849	99,5
1988	5958,5	837	86,8	90,4	86,5	81,8	81,0	78,5	7659	87,2
1989	6523,5	837	98,4	93,4	89,2	84,6	89,0	82,4	8661	98,9
1990	5758,7	842	80,7	89,9	78,1	82,8	78,0	81,2	7186	82,0
1991	6932,7	860	93,0	90,6	92,5	84,9	92,0	83,6	8213	93,8
1992	5451,1	860	72,4	87,3	72,4	82,7	72,2	81,5	6587	75,0
1993	4675,9	860	62,3	83,5	62,3	79,6	62,1	78,6	7064	80,6
1994	6443,2	860	86,0	83,8	86,0	80,4	85,5	79,5	8760	100,0
1995	6113,4	860	81,3	83,6	81,3	80,5	81,1	79,7	7876	89,9
1996	6957,8	860	92,1	84,5	92,1	81,7	92,1	81,0	8783	100,0
1997	6346,5	860	84,2	84,4	84,2	82,0	84,2	81,3	8003	91,4
1998	4122,4	785	59,9	82,5	59,8	80,2	59,9	79,6	5368	61,3
1999	4114,4	785	60,0	80,8	59,8	78,7	59,8	78,1	5414	61,8
2000	6530,9	785	93,7	81,7	93,7	79,7	94,7	79,3	8293	94,4
2001	5424,8	790	78,0	81,5	78,0	79,6	78,4	79,2	6852	78,2
2002	6686,0	790	97,0	82,4	97,0	80,7	96,6	80,3	8543	97,5
2003	4960,0	790	71,9	81,8	71,9	80,2	71,7	79,8	6301	71,9
2004	5695,8	790	83,0	81,9	82,8	80,3	82,1	79,9	7374	83,9
2005	6889,2	790	99,7	82,8	99,4	81,3	99,5	80,9	8745	99,8
2006	5283,9	790	76,6	82,5	76,4	81,1	76,3	80,7	6791	77,5
2007	6485,3	795	94,0	83,0	93,4	81,6	93,1	81,3	8341	95,2
2008	6514,4	782	94,5	83,5	94,3	82,2	94,8	81,9	8699	99,0
2009	5266,4	782	80,6	83,4	80,6	82,1	76,9	81,7	6906	78,8
2010	6930,2	782	98,8	84,0	98,6	82,8	101,2	82,4	8760	100,0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					328	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				51		
D. Inspection, maintenance or repair without refuelling				661	41	
E. Testing of plant systems or components				0		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	12
L. Human factor related					2	
Subtotal	0	0	0	712	375	12
Total		0			1099	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems		9
14. Safety Systems		23
15. Reactor Cooling Systems		73
16. Steam generation systems		148
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		3
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		9
33. Circulating Water System		6
35. All other I&C Systems		1
41. Main Generator Systems		1
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		3
Total	0	316

CA-22 DARLINGTON-1

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 878.0 MW(e)
 Design Net Capacity: 881.0 MW(e)
 Design Discharge Burnup: 8625 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7244.9 GW(e).h
 Energy Availability Factor: 94.5%
 Load Factor: 94.2%
 Operating Factor: 98.9%
 Energy Unavailability Factor: 5.5%
 Total Off-line Time: 100 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	643.6	411.9	651.3	629.2	643.7	621.3	635.2	496.3	609.7	638.3	621.2	643.4	7244.9
EAF (%)	98.7	70.0	99.6	99.9	99.9	98.3	97.2	76.0	96.4	98.4	98.5	98.9	94.5
UCF (%)	99.5	70.7	99.6	100.0	99.9	99.9	99.8	77.4	98.9	99.4	99.3	99.4	95.5
LF (%)	98.5	69.8	99.7	99.5	98.5	98.3	97.2	76.0	96.4	97.7	98.3	98.5	94.2
OF (%)	100.0	85.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.9
EUf (%)	1.3	30.0	0.4	0.1	0.1	1.7	2.8	24.0	3.6	1.6	1.5	1.1	5.5
PUF (%)	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.4	29.1	0.1	0.0	0.1	0.1	0.2	22.6	1.1	0.7	0.7	0.6	4.5
XUF (%)	0.8	0.7	0.0	0.1	0.0	1.7	2.6	1.4	2.5	0.9	0.8	0.5	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 04 Jan 1982
 Date of First Criticality: 29/10/1990
 Date of Grid Connection: 19/12/1990
 Date of Commercial Operation: 14/11/1992

Lifetime Generation: 122363.0 GW(e).h
 Cumulative Energy Availability Factor: 84.5%
 Cumulative Load Factor: 84.0%
 Cumulative Unit Capability Factor: 85.5%
 Cumulative Energy Unavailability Factor: 15.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1992	974.0	881	96.8	96.8	96.8	96.8	75.5	75.5	1152	78.7
1993	6016.2	881	79.2	81.7	78.7	81.3	78.0	77.6	7213	82.3
1994	6326.6	881	83.5	82.5	83.1	82.2	82.0	79.6	7446	85.0
1995	6853.3	881	90.7	85.1	89.7	84.5	88.8	82.5	8046	91.8
1996	5745.3	881	75.7	82.8	75.0	82.3	74.2	80.5	6827	77.7
1997	4765.1	881	63.0	79.0	62.3	78.4	61.7	76.9	7236	82.6
1998	6427.5	881	84.3	79.9	83.3	79.2	83.3	77.9	7717	88.1
1999	7175.1	881	94.4	81.9	93.0	81.1	93.0	80.0	8705	99.4
2000	6280.6	881	82.0	81.9	81.2	81.1	81.2	80.2	7615	86.7
2001	6980.8	881	91.2	82.9	90.5	82.1	90.5	81.3	8502	97.1
2002	6532.9	881	85.5	83.2	84.7	82.4	84.6	81.6	7887	90.0
2003	6562.4	881	87.5	83.5	85.1	82.6	85.0	81.9	7846	89.6
2004	5612.1	881	73.6	82.7	72.8	81.8	72.5	81.2	6540	74.5
2005	7366.3	881	97.0	83.8	96.2	82.9	95.7	82.3	8553	97.6
2006	6388.9	878	85.2	83.9	83.4	82.9	83.1	82.3	7520	85.8
2007	7412.6	878	98.2	84.8	96.8	83.9	96.4	83.2	8647	98.7
2008	6125.3	878	80.8	84.6	79.7	83.6	79.4	83.0	7125	81.1
2009	6870.2	878	91.0	85.0	89.8	84.0	89.3	83.4	8038	91.8
2010	7244.9	878	95.5	85.5	94.5	84.5	94.2	84.0	8660	98.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		100			501	
D. Inspection, maintenance or repair without refuelling				618		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				53		
J. Grid limitation, failure or grid unavailability						4
Z. Others					1	
Subtotal	0	100	0	671	502	4
Total		100			1177	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1991 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		15
12. Reactor I&C Systems		38
13. Reactor Auxiliary Systems		5
14. Safety Systems		19
15. Reactor Cooling Systems		251
21. Fuel Handling and Storage Facilities		30
31. Turbine and auxiliaries		15
32. Feedwater and Main Steam System		1
35. All other I&C Systems		32
41. Main Generator Systems	100	64
42. Electrical Power Supply Systems		11
XX. Miscellaneous Systems		9
Total	100	490

CA-23 DARLINGTON-2

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 878.0 MW(e)
 Design Net Capacity: 881.0 MW(e)
 Design Discharge Burnup: 8625 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6234.3 GW(e).h
 Energy Availability Factor: 81.1%
 Load Factor: 81.1%
 Operating Factor: 82.7%
 Energy Unavailability Factor: 18.9%
 Total Off-line Time: 1512 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	652.3	587.3	643.0	624.7	646.6	604.7	635.4	612.1	180.1	0.0	394.2	653.9	6234.3
EAF (%)	100.0	99.9	98.4	99.2	99.4	95.7	97.3	93.7	28.5	0.0	62.3	99.9	81.1
UCF (%)	100.0	99.9	99.4	99.9	99.9	100.0	99.8	99.5	29.6	0.0	62.3	99.9	82.5
LF (%)	99.9	99.5	98.4	98.8	99.0	95.7	97.3	93.7	28.5	0.0	62.4	100.1	81.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	30.0	0.0	63.3	100.0	82.7
EUf (%)	0.0	0.1	1.6	0.8	0.6	4.3	2.7	6.3	71.5	100.0	37.7	0.1	18.9
PUF (%)	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3	70.2	100.0	32.3	0.0	17.0
UCLF (%)	0.0	0.1	0.3	0.1	0.1	0.0	0.2	0.2	0.2	0.0	5.4	0.1	0.6
XUF (%)	0.0	0.0	1.0	0.7	0.5	4.3	2.5	5.8	1.1	0.0	0.0	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 09 Jan 1981
 Date of First Criticality: 11 May 1989
 Date of Grid Connection: 15/01/1990
 Date of Commercial Operation: 10 Sep 1990

Lifetime Generation: 121984.0 GW(e).h
 Cumulative Energy Availability Factor: 77.3%
 Cumulative Load Factor: 77.1%
 Cumulative Unit Capability Factor: 78.3%
 Cumulative Energy Unavailability Factor: 22.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	1153.5	881	64.9	64.9	64.9	64.9	65.7	65.7	1608	80.7
1991	51.5	881	0.7	12.6	0.7	12.6	0.7	12.7	102	1.2
1992	1290.2	881	16.7	14.4	16.7	14.4	16.7	14.5	2418	27.5
1993	6370.2	881	83.3	35.7	82.7	35.6	82.5	35.6	7594	86.7
1994	6750.8	881	88.9	48.3	88.5	48.1	87.5	47.8	8069	92.1
1995	6953.0	881	91.3	56.5	90.7	56.2	90.1	55.9	8104	92.5
1996	6705.7	881	87.8	61.6	87.2	61.2	86.7	60.9	7752	88.3
1997	4710.4	881	61.7	61.6	61.5	61.3	61.0	60.9	7069	80.7
1998	6227.9	881	81.9	64.0	80.7	63.6	80.7	63.3	7492	85.5
1999	6469.1	881	85.1	66.3	83.8	65.8	83.8	65.5	7824	89.3
2000	6885.4	881	90.1	68.7	89.0	68.1	89.0	67.8	8221	93.6
2001	5826.4	881	76.3	69.3	75.5	68.7	75.5	68.5	7030	80.3
2002	7268.9	881	95.4	71.5	94.2	70.8	94.2	70.6	8627	98.5
2003	6084.1	881	81.6	72.2	79.3	71.5	78.8	71.2	7245	82.7
2004	7038.4	881	96.7	74.0	91.4	72.9	91.0	72.6	8737	99.5
2005	6056.2	878	79.7	74.3	78.9	73.3	78.7	73.0	7031	80.3
2006	7548.4	878	99.4	75.9	98.6	74.8	98.1	74.5	8745	99.8
2007	6364.8	878	83.4	76.3	82.9	75.3	82.8	75.0	7327	83.6
2008	7560.9	878	98.8	77.5	98.2	76.5	98.0	76.3	8696	99.0
2009	6745.3	878	88.4	78.1	87.7	77.1	87.7	76.9	7769	88.7
2010	6234.3	878	82.5	78.3	81.1	77.3	81.1	77.1	7248	82.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		32			653	
D. Inspection, maintenance or repair without refuelling	1480			493	16	
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					312	
Subtotal	1480	32	0	493	981	3
Total		1512			1477	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		34
12. Reactor I&C Systems		36
13. Reactor Auxiliary Systems		1
14. Safety Systems		10
15. Reactor Cooling Systems		415
16. Steam generation systems		59
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries		23
32. Feedwater and Main Steam System		7
35. All other I&C Systems		15
41. Main Generator Systems		9
42. Electrical Power Supply Systems	32	5
XX. Miscellaneous Systems		8
Total	32	626

CA-24 DARLINGTON-3

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 878.0 MW(e)
 Design Net Capacity: 881.0 MW(e)
 Design Discharge Burnup: 8625 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7500.9 GW(e).h
 Energy Availability Factor: 97.5%
 Load Factor: 97.5%
 Operating Factor: 98.7%
 Energy Unavailability Factor: 2.5%
 Total Off-line Time: 117 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	653.6	592.8	652.4	625.4	650.4	511.5	638.8	625.1	615.8	651.6	631.0	652.5	7500.9
EAF (%)	99.9	100.0	99.7	99.1	99.9	80.9	97.8	95.7	97.4	99.6	100.0	99.5	97.5
UCF (%)	99.9	100.0	99.7	99.9	99.9	82.9	100.0	100.0	99.9	100.0	100.0	99.7	98.5
LF (%)	100.1	100.5	99.9	98.9	99.6	80.9	97.8	95.7	97.4	99.7	99.8	99.9	97.5
OF (%)	100.0	100.0	100.0	100.0	100.0	83.8	100.0	100.0	100.0	100.0	100.0	100.0	98.7
EUf (%)	0.1	0.0	0.3	0.9	0.1	19.1	2.2	4.3	2.6	0.4	0.0	0.5	2.5
PUF (%)	0.0	0.0	0.3	0.0	0.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	1.4
UCLF (%)	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1
XUF (%)	0.0	0.0	0.0	0.9	0.0	2.0	2.2	4.3	2.5	0.4	0.0	0.1	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 09 Jan 1984
 Date of First Criticality: 11 Sep 1992
 Date of Grid Connection: 12 Jul 1992
 Date of Commercial Operation: 14/02/1993

Lifetime Generation: 118266.0 GW(e).h
 Cumulative Energy Availability Factor: 85.7%
 Cumulative Load Factor: 85.3%
 Cumulative Unit Capability Factor: 86.6%
 Cumulative Energy Unavailability Factor: 14.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	6003.4	881	89.8	89.8	89.2	89.2	85.0	85.0	7141	89.1
1994	6528.5	881	85.6	87.6	85.3	87.2	84.6	84.8	7642	87.2
1995	7061.5	881	92.9	89.5	92.2	88.9	91.5	87.1	8219	93.8
1996	7391.6	881	97.3	91.5	96.7	90.9	95.5	89.2	8574	97.6
1997	4010.8	881	52.4	83.5	52.1	83.0	52.0	81.7	6314	72.1
1998	7244.9	881	94.7	85.4	93.9	84.8	93.9	83.7	8593	98.1
1999	5629.1	881	75.1	83.9	72.9	83.1	72.9	82.2	6929	79.1
2000	6517.0	881	85.1	84.1	84.2	83.3	84.2	82.4	7822	89.0
2001	6578.0	881	86.3	84.3	85.2	83.5	85.2	82.7	7901	90.2
2002	6371.8	881	83.7	84.2	82.6	83.4	82.6	82.7	7595	86.7
2003	6827.2	881	89.5	84.7	88.6	83.9	88.5	83.3	8004	91.4
2004	6601.6	881	86.9	84.9	85.6	84.0	85.3	83.4	7649	87.1
2005	7562.0	878	99.1	86.0	98.3	85.1	98.2	84.6	8760	100.0
2006	5573.1	878	73.1	85.1	72.5	84.2	72.5	83.7	6452	73.7
2007	7221.1	878	94.8	85.7	93.9	84.9	93.9	84.4	8311	94.9
2008	7654.6	878	99.9	86.6	99.2	85.8	99.3	85.3	8784	100.0
2009	5657.2	878	74.5	85.9	73.6	85.0	73.6	84.6	6590	75.2
2010	7500.9	878	98.5	86.6	97.5	85.7	97.5	85.3	8643	98.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					281	
B. Refuelling without a maintenance					5	
D. Inspection, maintenance or repair without refuelling	117			628		
E. Testing of plant systems or components					8	
Subtotal	117	0	0	628	294	0
Total		117			922	

7. Equipment Related Full Outages, Analysis by System

System	2010	1993 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		20
13. Reactor Auxiliary Systems		15
14. Safety Systems		4
15. Reactor Cooling Systems		66
16. Steam generation systems		21
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities		30
31. Turbine and auxiliaries		71
32. Feedwater and Main Steam System		3
35. All other I&C Systems		29
42. Electrical Power Supply Systems		9
XX. Miscellaneous Systems		5
Total	0	275

CA-25 DARLINGTON-4

Operator: OPG (ONTARIO POWER GENERATION)
 Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 878.0 MW(e)
 Design Net Capacity: 881.0 MW(e)
 Design Discharge Burnup: 8625 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5633.7 GW(e).h
 Energy Availability Factor: 73.3%
 Load Factor: 73.2%
 Operating Factor: 75.5%
 Energy Unavailability Factor: 26.7%
 Total Off-line Time: 2148 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	651.9	82.7	0.0	257.8	644.4	623.5	643.7	175.2	618.9	652.2	631.9	651.4	5633.7
EAF (%)	99.9	14.0	0.0	40.8	98.8	98.6	98.4	26.8	97.9	100.0	100.0	99.6	73.3
UCF (%)	99.9	14.0	0.0	40.8	98.8	99.3	99.6	27.2	100.0	100.0	100.0	99.6	73.6
LF (%)	99.8	14.0	0.0	40.8	98.6	98.6	98.5	26.8	97.9	99.8	100.0	99.7	73.2
OF (%)	100.0	14.3	0.0	41.7	100.0	100.0	100.0	45.2	100.0	100.0	100.0	100.0	75.5
EUf (%)	0.1	86.0	100.0	59.2	1.2	1.4	1.6	73.2	2.1	0.0	0.0	0.4	26.7
PUf (%)	0.1	86.0	100.0	5.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	15.6
UCLF (%)	0.0	0.0	0.0	53.5	1.2	0.6	0.4	72.8	0.0	0.0	0.0	0.4	10.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.7	1.2	0.4	2.1	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SCRAM - FORCED OUTAGE - ADJUSTOR ROD AA18 DROVE SPURIOUSLY OUT OF CORE. THE AA FAILURE WAS CAUSED FROM A POWER SUPPLY FAILURE ON THE AA LOGIC MODULE. SCR #D-2010-05332.

5. Historical Summary

Date of Construction Start: 07 Jan 1985
 Date of First Criticality: 13/03/1993
 Date of Grid Connection: 17/04/1993
 Date of Commercial Operation: 14/06/1993
 Lifetime Generation: 115665.0 GW(e).h
 Cumulative Energy Availability Factor: 85.0%
 Cumulative Load Factor: 84.8%
 Cumulative Unit Capability Factor: 85.7%
 Cumulative Energy Unavailability Factor: 15.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	3057.8	881	74.0	74.0	73.9	73.9	67.6	67.6	3616	70.4
1994	7038.7	881	92.2	85.5	91.8	85.2	91.2	82.5	8143	93.0
1995	6750.6	881	88.1	86.5	87.7	86.2	87.5	84.4	7751	88.5
1996	6105.4	881	79.4	84.5	79.1	84.2	78.9	82.9	7023	80.0
1997	5069.6	881	66.0	80.5	65.7	80.2	65.7	79.1	7428	84.8
1998	6520.9	881	85.3	81.3	84.5	81.0	84.5	80.1	7699	87.9
1999	6216.1	881	81.6	81.4	80.5	80.9	80.5	80.2	7431	84.8
2000	6975.0	881	90.8	82.6	90.1	82.1	90.1	81.5	8219	93.6
2001	6836.3	881	89.6	83.4	88.6	82.9	88.6	82.3	8037	91.7
2002	7449.8	881	97.3	84.9	96.5	84.3	96.5	83.8	8760	100.0
2003	5428.9	881	72.3	83.7	70.6	83.0	70.3	82.5	6320	72.1
2004	7321.1	881	95.2	84.7	94.6	84.0	94.6	83.6	8451	96.2
2005	6569.7	878	86.5	84.8	85.6	84.1	85.3	83.7	7617	87.0
2006	7449.4	878	97.1	85.7	96.5	85.0	96.9	84.7	8541	97.5
2007	6210.2	878	81.4	85.4	80.8	84.7	80.7	84.4	7170	81.8
2008	7525.5	878	98.4	86.3	97.3	85.6	97.6	85.2	8652	98.5
2009	6836.1	878	89.7	86.5	88.7	85.7	88.9	85.5	7892	90.1
2010	5633.7	878	73.6	85.7	73.3	85.0	73.2	84.8	6612	75.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		792			290	
D. Inspection, maintenance or repair without refuelling	1356			579		
E. Testing of plant systems or components				19	3	
J. Grid limitation, failure or grid unavailability						5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					15	
Subtotal	1356	792	0	598	308	6
Total		2148			912	

7. Equipment Related Full Outages, Analysis by System

System	2010	1993 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	136	
12. Reactor I&C Systems	50	52
13. Reactor Auxiliary Systems		11
14. Safety Systems		18
15. Reactor Cooling Systems		114
16. Steam generation systems		4
21. Fuel Handling and Storage Facilities	453	
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		12
33. Circulating Water System		8
41. Main Generator Systems		2
42. Electrical Power Supply Systems		22
XX. Miscellaneous Systems	153	8
Total	792	285

CA-12 GENTILLY-2

Operator: HQ (HYDRO QUEBEC)

Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 635.0 MW(e)
 Design Net Capacity: 645.0 MW(e)
 Design Discharge Burnup: 7000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3490.5 GW(e).h
 Energy Availability Factor: 62.7%
 Load Factor: 62.7%
 Operating Factor: 64.4%
 Energy Unavailability Factor: 37.3%
 Total Off-line Time: 3119 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	472,4	426,7	472,4	140,3	0,0	0,0	0,0	428,8	436,7	450,0	199,5	463,5	3490,5
EAF (%)	100,0	100,0	100,0	30,7	0,0	0,0	0,0	90,8	95,5	95,2	43,6	98,1	62,7
UCF (%)	100,0	100,0	100,0	30,7	0,0	0,0	0,0	91,5	100,0	100,0	51,5	98,1	64,2
LF (%)	100,0	100,0	100,0	30,7	0,0	0,0	0,0	90,8	95,5	95,2	43,6	98,1	62,7
OF (%)	100,0	100,0	100,0	30,7	0,0	0,0	0,0	91,5	100,0	100,0	51,5	100,0	64,4
EUF (%)	0,0	0,0	0,0	69,3	100,0	100,0	100,0	9,2	4,5	4,8	56,4	1,9	37,3
PUF (%)	0,0	0,0	0,0	69,3	100,0	23,3	0,0	0,0	0,0	0,0	0,0	0,0	16,1
UCLF (%)	0,0	0,0	0,0	0,0	0,0	76,7	100,0	8,5	0,0	0,0	48,5	1,9	19,7
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,8	4,5	4,8	7,9	0,0	1,5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

FULL PLANNED OUTAGE WITH LONG UNPLANNED EXTENSION TO REPAIR MOV. MANY POWER REDUCTIONS.

5. Historical Summary

Date of Construction Start: 04 Jan 1974 Lifetime Generation: 117053.1 GW(e).h
 Date of First Criticality: 09 Nov 1982 Cumulative Energy Availability Factor: 80.2%
 Date of Grid Connection: 12 Apr 1982 Cumulative Load Factor: 76.9%
 Date of Commercial Operation: 10 Jan 1983 Cumulative Unit Capability Factor: 82.1%
 Cumulative Energy Unavailability Factor: 19.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	937,7	645	65,9	65,9	65,9	65,9	65,8	65,8	1580	71,6
1984	3426,0	645	67,8	67,4	67,8	67,4	60,5	61,5	6742	76,8
1985	3189,4	645	72,7	69,8	71,1	69,1	56,4	59,3	6347	72,5
1986	3792,1	645	85,8	74,7	85,8	74,2	67,1	61,7	7488	85,5
1987	4658,5	640	86,3	77,4	85,5	76,8	83,1	66,7	7654	87,4
1988	5283,6	640	96,0	80,9	95,3	80,4	94,0	71,9	8372	95,3
1989	4870,3	640	90,0	82,4	89,5	81,8	86,9	74,3	7722	88,2
1990	4080,6	640	90,4	83,5	72,9	80,6	72,8	74,1	7748	88,4
1991	3925,5	640	71,4	82,0	69,9	79,3	70,0	73,6	6317	72,1
1992	4701,5	640	84,8	82,3	84,8	79,9	83,6	74,7	7431	84,6
1993	4827,1	685	92,9	83,4	92,4	81,2	80,4	75,3	7731	88,3
1994	5405,5	635	98,6	84,8	98,6	82,7	97,2	77,2	8634	98,6
1995	4519,0	635	82,5	84,6	82,5	82,7	81,2	77,5	7229	82,5
1996	5242,0	635	94,4	85,3	94,4	83,6	94,0	78,7	8289	94,4
1997	4217,5	635	78,8	84,9	78,8	83,2	75,8	78,5	6901	78,8
1998	3825,1	635	71,4	84,0	71,4	82,5	68,8	77,9	6258	71,4
1999	3793,3	635	88,6	84,3	69,9	81,7	68,2	77,3	6132	70,0
2000	4886,2	635	89,7	84,6	89,7	82,2	87,6	77,9	7879	89,7
2001	4711,2	635	88,3	84,8	88,3	82,5	84,7	78,3	7766	88,7
2002	4532,3	635	83,3	84,7	83,3	82,5	81,5	78,4	7366	84,1
2003	3567,1	635	65,2	83,8	65,2	81,7	64,1	77,7	5833	66,6
2004	4875,4	635	89,2	84,0	89,2	82,0	87,4	78,2	7905	90,0
2005	4486,2	635	83,7	84,0	83,5	82,1	80,6	78,3	7329	83,7
2006	4595,3	635	86,1	84,1	86,1	82,3	82,6	78,5	7541	86,1
2007	4328,6	635	81,3	84,0	77,8	82,1	77,8	78,4	7126	81,3
2008	3648,4	635	67,5	83,3	65,4	81,4	65,4	77,9	6207	70,7
2009	3611,4	635	68,1	82,7	64,9	80,8	64,9	77,4	6039	68,9
2010	3490,5	635	64,2	82,1	62,7	80,2	62,7	76,9	5641	64,4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1708			313	
B. Refuelling without a maintenance					19	
D. Inspection, maintenance or repair without refuelling	1411			917	0	
E. Testing of plant systems or components				0	4	
H. Nuclear regulatory requirements					19	
J. Grid limitation, failure or grid unavailability				1	1	3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						64
Z. Others					51	
Subtotal	1411	1708	0	918	407	67
Total		3119			1392	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		36
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems	349	32
14. Safety Systems		3
15. Reactor Cooling Systems		25
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		51
31. Turbine and auxiliaries		37
32. Feedwater and Main Steam System		7
41. Main Generator Systems		46
42. Electrical Power Supply Systems		33
XX. Miscellaneous Systems	1359	13
Total	1708	293

CA-4 PICKERING-1

Operator: OPG (ONTARIO POWER GENERATION)
 Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 515.0 MW(e)
 Design Net Capacity: 508.0 MW(e)
 Design Discharge Burnup: 9080 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2376.1 GW(e).h
 Energy Availability Factor: 52.7%
 Load Factor: 52.7%
 Operating Factor: 56.9%
 Energy Unavailability Factor: 47.3%
 Total Off-line Time: 3777 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	197,9	237,5	195,3	142,7	0,0	0,0	0,0	127,5	354,7	377,2	359,8	383,5	2376,1
EAF (%)	52,6	68,6	51,0	38,5	0,0	0,0	0,0	33,3	95,8	98,4	97,0	99,9	52,7
UCF (%)	52,6	68,6	51,0	38,5	0,0	0,0	0,0	33,8	96,7	99,0	97,0	99,9	52,9
LF (%)	51,6	68,6	51,0	38,5	0,0	0,0	0,0	33,3	95,6	98,5	97,0	100,1	52,7
OF (%)	55,2	74,7	54,4	39,7	0,0	0,0	0,0	60,6	100,0	100,0	100,0	100,0	56,9
EUf (%)	47,4	31,4	49,0	61,5	100,0	100,0	100,0	66,7	4,2	1,6	3,0	0,1	47,3
PUF (%)	0,0	0,0	0,0	60,3	100,0	100,0	61,2	16,5	0,0	0,0	0,3	0,0	28,3
UCLF (%)	47,4	31,4	49,0	1,3	0,0	0,0	38,8	49,8	3,3	1,0	2,8	0,1	18,8
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,9	0,6	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED. SCRAM - 1. CONTINUATION OF FORCED OUTAGE P1013. REPAIR CRACKED WELD ON REHEAT RETURN LINE TO BOILER 8, REACTOR TRIP ON START-UP. 2. FORCED OUTAGE P1014: FOLLOWING A FAILED BOILER LEVEL CONTROLLER LEADING TO A GOVERNOR VALVE TRIP AND A PARTIAL LOSS OF CL IV POWER AND REACTOR TRIP.

5. Historical Summary

Date of Construction Start: 06 Jan 1966
 Date of First Criticality: 25/02/1971
 Date of Grid Connection: 04 Apr 1971
 Date of Commercial Operation: 29/07/1971
 Lifetime Generation: 90874.0 GW(e).h
 Cumulative Energy Availability Factor: 65.9%
 Cumulative Load Factor: 63.1%
 Cumulative Unit Capability Factor: 66.1%
 Cumulative Energy Unavailability Factor: 34.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	1921,7	514	100,0	100,0	100,0	100,0	84,7	84,7	3546	80,3
1972	2207,9	514	100,0	100,0	100,0	100,0	48,9	60,9	4117	46,9
1973	4222,4	514	94,0	97,6	94,0	97,6	92,3	73,5	8523	95,7
1974	3232,0	514	71,9	90,3	71,9	90,3	72,0	73,1	6979	79,9
1975	3592,8	512	80,2	88,1	80,2	88,1	80,3	74,7	7234	82,8
1976	4169,7	514	92,7	88,9	92,7	88,9	92,6	77,9	8136	92,9
1977	3852,8	514	85,8	88,4	85,8	88,4	85,8	79,1	7545	86,4
1978	4273,7	515	95,1	89,3	95,1	89,3	95,0	81,2	8359	95,7
1979	3781,4	515	85,3	88,8	85,3	88,8	82,9	81,4	7554	85,3
1980	3356,9	515	73,7	87,2	73,7	87,2	74,2	80,7	6640	75,6
1981	3947,7	515	88,0	87,3	88,0	87,3	87,5	81,3	7795	89,0
1982	3499,3	515	77,8	86,5	77,8	86,5	77,6	81,0	6915	78,9
1983	3070,8	515	68,1	85,0	68,1	85,0	68,1	80,0	6101	69,6
1984	0,0	515	0,0	78,7	0,0	78,7	0,0	74,0	0	0,0
1985	0,0	515	0,0	73,3	0,0	73,3	0,0	68,9	0	0,0
1986	0,0	515	0,0	68,6	0,0	68,6	0,0	64,5	0	0,0
1987	832,8	515	19,7	65,6	17,4	65,5	18,5	61,7	1981	22,6
1988	3986,5	515	89,2	67,0	89,1	66,8	88,1	63,2	8224	93,6
1989	3222,1	515	72,7	67,3	72,6	67,1	71,4	63,7	6943	79,3
1990	3041,7	515	70,9	67,5	70,6	67,3	67,4	63,8	7435	84,9
1991	3051,1	515	67,8	67,5	67,8	67,3	67,6	64,0	6525	74,5
1992	2920,0	515	65,4	67,4	65,4	67,2	64,5	64,1	5798	66,0
1993	3451,2	515	78,4	67,9	78,4	67,7	76,5	64,6	6908	78,9
1994	897,6	515	20,1	65,8	20,1	65,7	19,9	62,7	1835	20,9
1995	2013,2	515	45,7	65,0	44,8	64,9	44,6	62,0	4234	48,3
1996	3011,8	515	66,8	65,1	66,8	64,9	66,6	62,2	6202	70,6
1997	3950,8	515	89,7	66,0	89,7	65,9	88,5	63,1	8205	94,7
1998			Data not available - Long-term shutdown							
1999										
2000										
2001										
2002										
2003										
2004										
2005	585,0	515	96,9	66,4	96,9	66,3	38,8	62,8	1230	42,0
2006	3470,5	515	77,2	66,8	77,0	66,6	76,9	63,3	7260	82,9
2007	1750,3	515	38,9	65,8	38,9	65,7	38,8	62,5	3447	39,3
2008	2792,1	515	61,8	65,7	61,7	65,5	61,7	62,5	6221	70,8
2009	4108,8	515	91,4	66,5	91,1	66,4	91,1	63,4	8436	96,3
2010	2376,1	515	52,9	66,1	52,7	65,9	52,7	63,1	4983	56,9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1425			1512	
B. Refuelling without a maintenance					58	
D. Inspection, maintenance or repair without refuelling	2353			540		
E. Testing of plant systems or components				5	5	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	75
Subtotal	2353	1425	0	545	1586	76
Total		3778			2207	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1971 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		870
12. Reactor I&C Systems		59
13. Reactor Auxiliary Systems	114	49
14. Safety Systems		62
15. Reactor Cooling Systems	317	112
16. Steam generation systems	128	59
21. Fuel Handling and Storage Facilities	333	35
31. Turbine and auxiliaries	533	34
32. Feedwater and Main Steam System		25
35. All other I&C Systems		2
41. Main Generator Systems		52
42. Electrical Power Supply Systems		114
XX. Miscellaneous Systems		8
Total	1425	1481

CA-7 PICKERING-4

Operator: OPG (ONTARIO POWER GENERATION)
Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 515.0 MW(e)
Design Net Capacity: 508.0 MW(e)
Design Discharge Burnup: 9080 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3203.5 GW(e).h
Energy Availability Factor: 71.1%
Load Factor: 71.0%
Operating Factor: 75.1%
Energy Unavailability Factor: 28.9%
Total Off-line Time: 2177 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	130,4	343,4	382,6	148,5	23,2	363,4	311,6	307,5	367,5	357,1	271,8	196,6	3203,5
EAF (%)	34,0	99,3	99,7	40,1	6,0	98,4	81,4	80,3	99,7	93,3	73,3	51,5	71,1
UCF (%)	34,0	99,4	99,7	40,1	6,1	98,4	81,8	82,1	100,0	93,7	73,3	51,5	71,4
LF (%)	34,0	99,2	99,9	40,0	6,0	98,0	81,3	80,3	99,1	93,2	73,3	51,3	71,0
OF (%)	38,8	100,0	100,0	40,3	7,8	100,0	85,1	90,3	100,0	100,0	88,2	54,6	75,1
EUF (%)	66,0	0,7	0,3	59,9	94,0	1,6	18,6	19,7	0,3	6,7	26,7	48,5	28,9
PUF (%)	0,0	0,0	0,2	59,7	94,0	0,7	0,0	0,0	0,0	1,4	0,0	0,0	13,1
UCLF (%)	66,0	0,7	0,1	0,2	0,0	0,9	18,3	17,9	0,0	4,9	26,7	48,5	15,5
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,3	1,8	0,3	0,4	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED.

5. Historical Summary

Date of Construction Start: 05 Jan 1968 **Lifetime Generation:** 94443.0 GW(e).h
Date of First Criticality: 16/05/1973 **Cumulative Energy Availability Factor:** 65.7%
Date of Grid Connection: 21/05/1973 **Cumulative Load Factor:** 65.5%
Date of Commercial Operation: 17/06/1973 **Cumulative Unit Capability Factor:** 66.0%
Cumulative Energy Unavailability Factor: 34.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	2226.6	514	90,5	90,5	90,5	90,5	90,2	90,2	4402	91,7
1974	4221,0	514	94,0	92,8	94,0	92,8	94,0	92,7	8356	95,7
1975	1094,2	513	24,2	65,9	24,2	65,9	24,4	65,9	2201	25,2
1976	3089,0	514	68,2	66,6	68,2	66,6	68,6	66,7	6063	69,2
1977	4107,2	514	90,3	71,8	90,3	71,8	91,5	72,1	7975	91,3
1978	4033,9	515	89,7	75,0	89,7	75,0	89,7	75,3	7876	90,2
1979	4102,2	515	91,0	77,5	91,0	77,5	89,9	77,6	8059	91,0
1980	3700,5	515	81,8	78,1	81,8	78,1	81,8	78,1	7321	83,3
1981	4142,0	515	91,7	79,6	91,7	79,6	91,8	79,7	8078	92,2
1982	4137,9	515	91,8	80,9	91,8	80,9	91,7	81,0	8087	92,3
1983	4170,2	515	92,3	82,0	92,3	82,0	92,4	82,1	8183	93,4
1984	3733,3	515	82,7	82,1	82,7	82,1	82,5	82,1	7425	84,5
1985	3438,9	515	83,5	82,2	77,5	81,7	76,2	81,6	6824	77,9
1986	3687,4	515	83,2	82,3	83,2	81,8	81,7	81,6	7410	84,6
1987	3770,4	515	84,3	82,4	84,0	82,0	83,6	81,8	7495	85,6
1988	3166,2	515	70,1	81,6	70,1	81,2	70,0	81,0	6525	74,3
1989	2255,5	515	50,0	79,7	50,0	79,3	50,0	79,1	5468	62,4
1990	1070,8	515	23,7	76,5	23,7	76,1	23,7	76,0	2851	32,5
1991	2130,8	515	47,3	74,9	47,3	74,6	47,2	74,4	5185	59,2
1992	0,0	515	0,0	71,1	0,0	70,8	0,0	70,6	0	0,0
1993	3309,6	515	74,2	71,2	73,8	70,9	73,4	70,8	6711	76,6
1994	4009,6	515	89,7	72,1	89,5	71,8	88,9	71,6	7915	90,4
1995	2807,0	515	63,8	71,7	63,3	71,4	62,2	71,2	5684	64,9
1996	1134,9	515	25,1	69,7	25,1	69,4	25,1	69,2	2230	25,4
1997	0,0	515	0,0	66,9	0,0	66,6	0,0	66,4	0	0,0
1998	Data not provided									
1999	Data not available - Long-term shutdown									
2000	"									
2001	"									
2002	"									
2003	844,8	515	69,7	66,9	69,7	66,6	69,7	66,4	1880	79,9
2004	3266,8	515	75,6	67,3	72,1	66,8	72,2	66,7	6739	76,7
2005	2996,5	515	66,5	67,2	66,4	66,8	66,4	66,6	5900	67,4
2006	2976,5	515	66,3	67,2	66,0	66,8	66,0	66,6	6149	70,2
2007	1959,1	515	43,4	66,4	43,4	66,0	43,4	65,8	4086	46,6
2008	3656,4	515	80,9	66,9	80,8	66,5	80,8	66,3	7765	88,4
2009	1620,2	515	36,1	65,9	35,9	65,5	35,9	65,3	3845	43,9
2010	3203,5	515	71,4	66,0	71,1	65,7	71,0	65,5	6583	75,1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1062			1058	
B. Refuelling without a maintenance					3	
D. Inspection, maintenance or repair without refuelling	1116			1096		
E. Testing of plant systems or components				58		
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	13
Subtotal	1116	1062	0	1154	1068	18
Total		2178			2240	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		42
12. Reactor I&C Systems	455	128
13. Reactor Auxiliary Systems		165
14. Safety Systems		13
15. Reactor Cooling Systems	183	455
16. Steam generation systems		21
31. Turbine and auxiliaries	424	36
32. Feedwater and Main Steam System		28
35. All other I&C Systems		5
41. Main Generator Systems		50
42. Electrical Power Supply Systems		104
XX. Miscellaneous Systems		1
Total	1062	1048

CA-13 PICKERING-5

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 516.0 MW(e)
Design Net Capacity: 516.0 MW(e)
Design Discharge Burnup: 8330 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3769.8 GW(e).h
Energy Availability Factor: 83.7%
Load Factor: 83.4%
Operating Factor: 87.3%
Energy Unavailability Factor: 16.3%
Total Off-line Time: 1115 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	376,7	339,6	375,1	160,0	42,7	359,6	371,0	322,4	351,4	330,6	361,7	379,0	3769,8
EAF (%)	99,0	98,5	98,4	43,2	11,1	96,8	96,8	84,0	94,6	86,1	97,8	99,7	83,7
UCF (%)	99,0	98,5	98,4	43,2	11,2	97,1	98,1	85,7	95,2	86,4	97,9	99,7	84,1
LF (%)	98,1	97,9	97,7	43,1	11,1	96,8	96,6	84,0	94,6	86,1	97,4	98,7	83,4
OF (%)	100,0	100,0	100,0	45,1	17,9	100,0	100,0	93,3	100,0	92,1	100,0	100,0	87,3
EUF (%)	1,0	1,5	1,6	56,8	88,9	3,2	3,2	16,0	5,4	13,9	2,2	0,3	16,3
PUF (%)	0,0	0,5	0,4	55,1	88,7	0,0	0,0	0,0	0,7	0,3	0,0	0,0	12,2
UCLF (%)	1,0	1,0	1,2	1,7	0,1	3,0	1,9	14,3	4,1	13,3	2,1	0,3	3,7
XUF (%)	0,0	0,0	0,0	0,0	0,1	0,2	1,2	1,7	0,6	0,3	0,0	0,0	0,4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED.

5. Historical Summary

Date of Construction Start: 11 Jän 1974
Date of First Criticality: 23/10/1982
Date of Grid Connection: 19/12/1982
Date of Commercial Operation: 05 Okt 1983

Lifetime Generation: 92444.0 GW(e).h
Cumulative Energy Availability Factor: 73.7%
Cumulative Load Factor: 73.5%
Cumulative Unit Capability Factor: 74.3%
Cumulative Energy Unavailability Factor: 26.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2719,9	516	90,3	90,3	90,3	90,3	89,6	89,6	5446	92,6
1984	3517,5	516	77,8	82,8	77,8	82,8	77,6	82,4	7035	80,1
1985	3366,5	516	83,1	82,9	77,7	80,9	74,5	79,5	6989	79,8
1986	4068,6	516	91,2	85,1	90,7	83,6	90,0	82,3	8057	92,0
1987	3600,1	516	80,3	84,1	79,6	82,7	79,6	81,8	7148	81,6
1988	4397,2	516	97,5	86,5	97,5	85,3	97,0	84,5	8683	98,9
1989	3400,8	516	75,7	84,9	75,4	83,8	75,2	83,1	6862	78,3
1990	3885,0	516	86,4	85,1	86,4	84,2	85,9	83,4	7821	89,3
1991	2887,1	516	64,6	82,7	64,4	81,9	63,9	81,2	5724	65,3
1992	1345,2	516	29,8	77,2	29,8	76,5	29,7	75,9	2621	29,8
1993	3841,8	516	85,6	78,0	85,4	77,3	85,0	76,7	8307	94,8
1994	3074,4	516	68,5	77,2	68,5	76,6	68,0	76,0	6196	70,7
1995	3372,9	516	75,0	77,0	74,8	76,4	74,6	75,9	7008	80,0
1996	3042,6	516	67,1	76,3	67,1	75,7	67,1	75,2	6429	73,2
1997	3924,9	516	86,8	77,0	86,8	76,5	86,8	76,0	7908	90,3
1998	3490,6	516	77,2	77,0	77,2	76,5	77,2	76,1	7296	83,3
1999	2511,6	516	55,6	75,7	55,6	75,3	55,6	74,9	5302	60,5
2000	2631,5	516	58,1	74,7	58,0	74,3	58,1	73,9	5457	62,1
2001	2980,2	516	66,6	74,3	65,9	73,9	65,9	73,5	5986	68,3
2002	2655,7	516	59,2	73,5	58,8	73,1	58,8	72,7	5565	63,5
2003	3295,0	516	71,1	73,4	69,1	72,9	72,9	72,7	6566	75,0
2004	4159,8	516	92,6	74,3	92,2	73,8	91,8	73,6	8264	94,1
2005	2352,8	516	53,6	73,4	52,6	72,9	52,1	72,7	4818	55,0
2006	4010,9	516	89,7	74,1	88,9	73,5	88,7	73,3	8113	92,6
2007	2567,6	516	57,5	73,4	57,0	72,9	56,8	72,7	5637	64,3
2008	4026,8	516	89,8	74,0	88,9	73,5	88,8	73,3	8357	95,1
2009	3140,9	516	70,1	73,9	69,6	73,3	69,5	73,2	6631	75,7
2010	3769,8	516	84,1	74,3	83,7	73,7	83,4	73,5	7645	87,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		109			876	
B. Refuelling without a maintenance					65	
D. Inspection, maintenance or repair without refuelling	1007			854		
E. Testing of plant systems or components				0	2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				33	9	16
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					19	
Subtotal	1007	109	0	887	971	17
Total		1116			1875	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		77
13. Reactor Auxiliary Systems		67
14. Safety Systems		22
15. Reactor Cooling Systems	50	131
16. Steam generation systems		340
31. Turbine and auxiliaries	59	42
32. Feedwater and Main Steam System		9
33. Circulating Water System		6
35. All other I&C Systems		9
41. Main Generator Systems		93
42. Electrical Power Supply Systems		67
Total	109	866

CA-14 PICKERING-6

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 516.0 MW(e)
 Design Net Capacity: 516.0 MW(e)
 Design Discharge Burnup: 8330 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3865.3 GW(e).h
 Energy Availability Factor: 85.8%
 Load Factor: 85.5%
 Operating Factor: 87.4%
 Energy Unavailability Factor: 14.2%
 Total Off-line Time: 1101 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	378,5	344,6	384,5	173,4	78,8	366,2	328,0	320,0	365,5	379,7	362,3	383,9	3865,3
EAF (%)	99,3	99,7	100,0	46,4	20,7	99,0	85,7	83,5	99,0	99,8	98,1	100,0	85,8
UCF (%)	99,3	99,7	100,0	46,4	20,7	99,1	86,2	85,0	99,2	99,8	98,1	100,0	86,0
LF (%)	98,6	99,4	100,2	46,7	20,5	98,6	85,4	83,3	98,4	98,9	97,5	100,0	85,5
OF (%)	100,0	100,0	100,0	46,7	24,6	100,0	89,9	89,1	100,0	100,0	100,0	100,0	87,4
EUF (%)	0,7	0,3	0,0	53,6	79,3	1,0	14,3	16,5	1,0	0,2	1,9	0,0	14,2
PUF (%)	0,0	0,0	0,0	53,4	79,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	11,1
UCLF (%)	0,7	0,3	0,0	0,2	0,1	0,9	13,8	15,0	0,8	0,2	1,9	0,0	2,9
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,2	0,4	1,5	0,2	0,0	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED.

5. Historical Summary

Date of Construction Start: 10 Jan 1975 Lifetime Generation: 94869.0 GW(e).h
 Date of First Criticality: 15/10/1983 Cumulative Energy Availability Factor: 77.6%
 Date of Grid Connection: 11 Aug 1983 Cumulative Load Factor: 77.5%
 Date of Commercial Operation: 02 Jan 1984 Cumulative Unit Capability Factor: 78.2%
 Cumulative Energy Unavailability Factor: 22.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	3562,9	516	86,1	86,1	86,1	86,1	85,9	85,9	7048	87,7
1985	3289,1	516	79,5	82,6	73,1	79,3	72,8	79,0	6540	74,7
1986	3395,2	516	76,1	80,4	75,8	78,1	75,1	77,7	6763	77,2
1987	3949,9	516	88,5	82,5	86,6	80,3	87,4	80,2	7791	88,9
1988	4496,8	516	98,5	85,7	98,4	84,0	99,2	84,0	8775	99,9
1989	3950,2	516	87,9	86,1	87,6	84,6	87,4	84,6	7794	89,0
1990	3473,5	516	77,7	84,9	76,9	83,5	76,8	83,5	7017	80,1
1991	4469,7	516	99,2	86,7	99,0	85,4	98,9	85,4	8721	99,6
1992	4050,5	516	89,3	87,0	89,3	85,9	89,4	85,9	7936	90,3
1993	2689,2	516	60,4	84,3	59,9	83,3	59,5	83,2	5506	62,9
1994	4043,0	516	90,2	84,8	90,1	83,9	89,4	83,8	8036	91,7
1995	3493,3	516	77,5	84,2	77,2	83,3	77,3	83,2	6962	79,5
1996	2591,7	516	57,2	82,1	57,2	81,3	57,2	81,2	5707	65,0
1997	3386,2	516	74,9	81,6	74,9	80,8	74,9	80,8	6841	78,1
1998	3130,1	516	69,7	80,8	69,2	80,1	69,2	80,0	6384	72,9
1999	3353,7	516	74,4	80,4	74,2	79,7	74,2	79,6	6863	78,3
2000	2738,7	516	60,6	79,2	60,5	78,5	60,4	78,5	6449	73,4
2001	2618,1	516	57,7	78,0	57,7	77,4	57,9	77,3	5286	60,3
2002	3982,3	516	88,9	78,6	88,3	78,0	88,1	77,9	7985	91,2
2003	3267,4	516	74,3	78,4	72,5	77,7	72,3	77,6	6566	75,0
2004	2780,8	516	61,7	77,6	61,5	76,9	61,4	76,9	5597	63,7
2005	2850,1	516	64,3	77,0	63,1	76,3	63,1	76,2	5596	63,9
2006	3899,5	516	86,1	77,4	86,0	76,7	86,3	76,7	7635	87,2
2007	3216,5	516	71,3	77,1	70,8	76,5	71,2	76,4	6588	75,2
2008	4323,8	516	95,8	77,9	95,6	77,2	95,4	77,2	8521	97,0
2009	3493,2	516	78,0	77,9	77,6	77,2	77,3	77,2	7051	80,5
2010	3865,3	516	86,0	78,2	85,8	77,6	85,5	77,5	7659	87,4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		156			620	
B. Refuelling without a maintenance					47	
D. Inspection, maintenance or repair without refuelling	945			913		
E. Testing of plant systems or components				0	3	
J. Grid limitation, failure or grid unavailability						22
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	21
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	945	156	0	913	672	45
Total		1101			1630	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		58
12. Reactor I&C Systems		51
13. Reactor Auxiliary Systems		38
14. Safety Systems		49
15. Reactor Cooling Systems		48
16. Steam generation systems		128
21. Fuel Handling and Storage Facilities		12
31. Turbine and auxiliaries		55
32. Feedwater and Main Steam System		45
33. Circulating Water System	81	2
35. All other I&C Systems		6
41. Main Generator Systems	75	74
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		25
Total	156	604

CA-15 PICKERING-7

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 516.0 MW(e)
 Design Net Capacity: 516.0 MW(e)
 Design Discharge Burnup: 8330 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2920.7 GW(e).h
 Energy Availability Factor: 64.8%
 Load Factor: 64.6%
 Operating Factor: 67.3%
 Energy Unavailability Factor: 35.2%
 Total Off-line Time: 2865 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	378,4	345,4	379,8	160,4	15,3	356,3	370,8	362,9	268,4	0,0	0,0	282,9	2920,7
EAF (%)	98,8	99,8	99,4	43,4	4,0	95,9	96,8	94,5	72,6	0,0	0,0	74,0	64,8
UCF (%)	98,8	99,8	99,4	43,4	4,0	96,2	97,8	96,5	73,5	0,0	0,0	74,0	65,1
LF (%)	98,6	99,6	98,9	43,2	4,0	95,9	96,6	94,5	72,2	0,0	0,0	73,7	64,6
OF (%)	100,0	100,0	100,0	43,5	8,9	100,0	100,0	100,0	75,4	0,0	0,0	81,3	67,3
EUf (%)	1,2	0,2	0,6	56,6	96,0	4,1	3,2	5,5	27,4	100,0	100,0	26,0	35,2
PUF (%)	0,0	0,0	0,1	56,6	88,9	0,3	0,0	0,0	25,7	100,0	100,0	24,8	33,2
UCLF (%)	1,2	0,2	0,5	0,0	7,1	3,5	2,2	3,5	0,8	0,0	0,0	1,1	1,7
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,3	1,1	1,9	0,9	0,0	0,0	0,0	0,3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED.

5. Historical Summary

Date of Construction Start: 03 Jän 1976 Lifetime Generation: 90771.0 GW(e).h
 Date of First Criticality: 22/10/1984 Cumulative Energy Availability Factor: 77.2%
 Date of Grid Connection: 17/11/1984 Cumulative Load Factor: 76.9%
 Date of Commercial Operation: 01 Jän 1985 Cumulative Unit Capability Factor: 77.8%
 Cumulative Energy Unavailability Factor: 22.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	4094,0	516	99,0	99,0	92,6	92,6	90,6	90,6	8277	94,5
1986	3373,3	516	75,5	87,2	75,2	83,9	74,6	82,6	7002	79,9
1987	4339,9	516	97,4	90,6	96,0	87,9	96,0	87,1	8642	98,7
1988	4340,4	516	95,9	92,0	95,4	89,8	95,8	89,2	8519	97,0
1989	3408,7	516	77,1	89,0	75,4	86,9	75,4	86,5	6939	79,2
1990	3500,8	516	78,4	87,2	77,7	85,4	77,4	85,0	7420	84,7
1991	4258,8	516	94,9	88,3	94,5	86,7	94,2	86,3	8436	96,3
1992	3727,4	516	82,4	87,6	82,4	86,2	82,2	85,8	7349	83,7
1993	4415,9	516	99,9	89,0	99,0	87,6	97,7	87,1	8760	100,0
1994	3709,9	516	83,4	88,4	83,4	87,2	82,1	86,6	7386	84,3
1995	4056,8	516	90,4	88,6	90,0	87,4	89,7	86,9	8140	92,9
1996	2050,7	516	45,4	85,0	45,4	83,9	45,2	83,4	4416	50,3
1997	2936,2	516	65,0	83,4	65,0	82,5	65,0	82,0	6208	70,9
1998	3084,7	516	68,9	82,4	68,2	81,4	68,2	81,0	6495	74,1
1999	4433,8	516	98,8	83,5	98,0	82,5	98,1	82,2	8751	99,9
2000	2099,0	516	46,4	81,2	46,3	80,3	46,3	79,9	4445	50,6
2001	4020,8	516	89,0	81,6	88,7	80,8	89,0	80,4	7968	91,0
2002	4246,9	516	94,4	82,3	93,9	81,5	94,0	81,2	8538	97,5
2003	1790,7	516	39,8	80,1	39,7	79,3	39,6	79,0	3811	43,5
2004	3116,1	516	68,9	79,5	68,9	78,8	68,7	78,5	6127	69,8
2005	4390,8	516	97,8	80,4	97,4	79,7	97,1	79,4	8658	98,8
2006	2652,6	516	59,1	79,4	59,1	78,7	58,7	78,4	5311	60,6
2007	3667,9	516	82,0	79,6	81,7	78,9	81,1	78,6	7540	86,1
2008	1530,3	516	34,0	77,7	34,0	77,0	33,8	76,7	3084	35,1
2009	4229,5	516	94,5	78,3	94,1	77,7	93,6	77,4	8492	96,9
2010	2920,7	516	65,1	77,8	64,8	77,2	64,6	76,9	5895	67,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		53			627	
B. Refuelling without a maintenance					157	
D. Inspection, maintenance or repair without refuelling	2812			717		
E. Testing of plant systems or components				1	11	
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					8	17
Z. Others					35	
Subtotal	2812	53	0	718	838	20
Total		2865			1576	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	53	104
12. Reactor I&C Systems		29
13. Reactor Auxiliary Systems		18
14. Safety Systems		42
15. Reactor Cooling Systems		96
16. Steam generation systems		49
31. Turbine and auxiliaries		27
32. Feedwater and Main Steam System		24
33. Circulating Water System		12
41. Main Generator Systems		90
42. Electrical Power Supply Systems		65
XX. Miscellaneous Systems		60
Total	53	616

CA-16 PICKERING-8

Operator: OPG (ONTARIO POWER GENERATION)

Contractor: OH/AECL (ONTARIO HYDRO / ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 516.0 MW(e)
 Design Net Capacity: 516.0 MW(e)
 Design Discharge Burnup: 8330 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3081.1 GW(e).h
 Energy Availability Factor: 68.2%
 Load Factor: 68.2%
 Operating Factor: 73.4%
 Energy Unavailability Factor: 31.8%
 Total Off-line Time: 2333 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	317,3	334,9	364,3	146,1	0,0	0,0	136,7	324,4	352,3	372,0	360,0	373,1	3081,1
EAF (%)	82,6	96,6	94,9	39,3	0,0	0,0	35,6	84,5	94,8	96,9	96,9	97,2	68,2
UCF (%)	82,6	96,6	95,0	39,3	0,0	0,0	36,0	86,8	95,8	97,5	96,9	97,2	68,5
LF (%)	82,6	96,6	94,9	39,3	0,0	0,0	35,6	84,5	94,8	96,9	96,9	97,2	68,2
OF (%)	91,0	100,0	100,0	42,5	0,0	0,0	51,6	96,2	100,0	100,0	100,0	100,0	73,4
EUF (%)	17,4	3,4	5,1	60,7	100,0	100,0	64,4	15,5	5,2	3,1	3,1	2,8	31,8
PUF (%)	0,0	0,0	0,8	58,9	100,0	93,7	13,8	0,0	0,0	0,0	0,1	0,0	22,3
UCLF (%)	17,4	3,4	4,2	1,8	0,0	6,3	50,3	13,2	4,2	2,5	3,0	2,8	9,2
XUF (%)	0,0	0,0	0,1	0,0	0,0	0,0	0,4	2,3	1,0	0,6	0,0	0,0	0,4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SITE VACUUM BUILDING OUTAGE COMPLETED. SCRAM - SDS1 AND 2 TRIPPED DURING P-38 TEST DUE TO FOUR D2O MV VALVES OPENING (8-33350-MV40 MV42 MV44 MV46) WHEN LOCA CONDITIONING LOGIC WAS INITIATED. SEE SCR P-2010-17119.

5. Historical Summary

Date of Construction Start: 09 Jan 1976 Lifetime Generation: 85240.0 GW(e).h
 Date of First Criticality: 17/12/1985 Cumulative Energy Availability Factor: 75.8%
 Date of Grid Connection: 21/01/1986 Cumulative Load Factor: 75.6%
 Date of Commercial Operation: 28/02/1986 Cumulative Unit Capability Factor: 76.5%
 Cumulative Energy Unavailability Factor: 24.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	3771,0	516	92,2	92,2	91,9	91,9	91,2	91,2	7846	97,9
1987	3759,4	516	84,7	88,3	83,3	87,4	83,2	87,0	7585	86,6
1988	3710,4	516	82,5	86,3	82,3	85,6	81,9	85,2	7296	83,1
1989	4295,2	516	96,6	88,9	95,4	88,1	95,0	87,7	8569	97,8
1990	3014,7	516	66,7	84,4	66,6	83,7	66,7	83,5	6743	77,0
1991	4485,0	516	99,5	87,0	98,9	86,3	99,2	86,1	8759	100,0
1992	4212,0	516	93,0	87,8	92,9	87,3	92,9	87,1	8280	94,3
1993	3670,5	516	82,1	87,1	81,7	86,6	81,2	86,4	7233	82,6
1994	4341,9	516	96,8	88,2	96,8	87,7	96,1	87,4	8579	97,9
1995	4012,1	516	89,4	88,3	89,0	87,9	88,8	87,6	8066	92,1
1996	1300,3	516	28,7	82,9	28,7	82,4	28,7	82,2	2597	29,6
1997	360,8	516	8,0	76,6	8,0	76,2	8,0	75,9	995	11,3
1998	3493,6	516	78,0	76,7	77,3	76,3	77,3	76,0	7009	80,0
1999	3509,1	516	78,4	76,8	77,6	76,4	77,6	76,2	7077	80,8
2000	2711,2	516	60,8	75,7	59,9	75,2	59,8	75,1	5508	62,7
2001	3502,2	516	78,2	75,9	77,5	75,4	77,5	75,2	6999	79,9
2002	3605,4	516	81,1	76,2	80,0	75,7	79,8	75,5	7244	82,7
2003	3921,3	516	89,7	76,9	86,9	76,3	86,8	76,1	8026	91,6
2004	2489,5	516	55,4	75,8	55,1	75,2	54,9	75,0	5182	59,0
2005	4195,2	516	94,6	76,7	93,4	76,1	92,8	75,9	8431	96,2
2006	2908,5	516	65,1	76,2	64,8	75,5	64,3	75,3	5853	66,8
2007	3843,2	516	87,3	76,7	85,5	76,0	85,0	75,8	8015	91,5
2008	2918,7	516	64,7	76,2	64,4	75,5	64,4	75,3	6116	69,6
2009	4115,2	516	91,6	76,8	91,0	76,1	91,0	75,9	8520	97,3
2010	3081,1	516	68,5	76,5	68,2	75,8	68,2	75,6	6427	73,4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		501			436	
B. Refuelling without a maintenance				214	208	
D. Inspection, maintenance or repair without refuelling	1833			847		
E. Testing of plant systems or components				0		
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
Subtotal	1833	501	0	1061	647	11
Total		2334			1719	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	22	
12. Reactor I&C Systems		30
13. Reactor Auxiliary Systems		3
14. Safety Systems	388	19
15. Reactor Cooling Systems		110
16. Steam generation systems		22
21. Fuel Handling and Storage Facilities		15
31. Turbine and auxiliaries		46
32. Feedwater and Main Steam System	12	37
33. Circulating Water System	67	12
35. All other I&C Systems		1
41. Main Generator Systems		13
42. Electrical Power Supply Systems	12	41
XX. Miscellaneous Systems		18
Total	501	367

CA-17 POINT LEPREAU

Operator: NBEPC (NEW BRUNSWICK ELECTRIC POWER COMMISSION)

Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 635.0 MW(e)
Design Net Capacity: 630.0 MW(e)
Design Discharge Burnup: 8000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
EAF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
UCF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
OF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
EUUF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
PUF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

CALANDRIA TUBES THAT WERE INSERTED WERE REMOVED SO TUBE SHEET BORE POLISHING COULD BE DONE TO CREATE PROPER TECHNICAL SPECIFICATIONS.

5. Historical Summary

Date of Construction Start: 05 Jän 1975 **Lifetime Generation:** 114945.7 GW(e).h
Date of First Criticality: 25/07/1982 **Cumulative Energy Availability Factor:** 74.6%
Date of Grid Connection: 09 Nov 1982 **Cumulative Load Factor:** 73.8%
Date of Commercial Operation: 02 Jän 1983 **Cumulative Unit Capability Factor:** 75.7%
Cumulative Energy Unavailability Factor: 25.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	4404.5	640	86,0	86,0	86,0	86,0	85,9	85,9	7164	89,4
1984	5000,9	635	89,0	87,6	88,9	87,5	89,7	87,8	7927	90,2
1985	5421,9	635	96,9	90,8	96,9	90,7	97,5	91,1	8547	97,6
1986	5223,1	635	94,0	91,6	93,4	91,4	93,9	91,8	8257	94,3
1987	5107,7	635	91,2	91,5	91,2	91,4	91,8	91,8	8110	92,6
1988	5338,3	635	94,9	92,1	94,9	92,0	95,7	92,5	8383	95,4
1989	5266,7	635	93,8	92,3	93,6	92,2	94,7	92,8	8271	94,4
1990	5333,7	635	95,0	92,7	94,7	92,5	95,9	93,2	8384	95,7
1991	5437,2	635	96,7	93,1	96,7	93,0	97,7	93,7	8500	97,0
1992	4829,8	635	85,8	92,4	85,8	92,3	86,6	93,0	7748	88,2
1993	5320,0	635	95,1	92,6	95,1	92,5	95,6	93,2	8391	95,8
1994	5230,1	635	93,5	92,7	93,5	92,6	94,0	93,3	8270	94,4
1995	1611,4	635	29,0	87,8	29,0	87,7	29,0	88,3	2615	29,9
1996	4587,8	635	81,4	87,3	81,4	87,2	82,3	87,9	7363	83,8
1997	3455,6	635	62,2	85,6	61,6	85,5	62,1	86,2	5564	63,5
1998	3782,4	635	67,1	84,5	66,0	84,3	68,0	85,0	6111	69,8
1999	4082,7	635	75,5	83,9	72,0	83,6	73,4	84,3	6797	77,6
2000	3966,9	635	77,6	83,6	70,5	82,8	71,1	83,6	6792	77,3
2001	4451,3	635	84,6	83,6	79,1	82,6	80,0	83,4	7418	84,7
2002	3760,6	635	71,6	83,0	67,6	81,9	67,6	82,6	6107	69,7
2003	4739,5	635	89,8	83,4	84,4	82,0	85,2	82,7	7869	89,8
2004	4299,7	635	83,3	83,4	82,6	82,0	77,1	82,5	7310	83,2
2005	4372,6	635	86,8	83,5	86,8	82,2	78,6	82,3	7632	87,1
2006	4362,0	635	88,7	83,7	88,7	82,5	78,4	82,1	7755	88,5
2007	4121,8	635	85,9	83,8	85,9	82,6	74,1	81,8	7511	85,7
2008	1150,6	635	24,0	81,5	24,0	80,4	20,6	79,5	2111	24,0
2009	0,0	635	0,0	78,5	0,0	77,4	0,0	76,5	0	0,0
2010	0,0	635	0,0	75,7	0,0	74,6	0,0	73,8	0	0,0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					251	1
B. Refuelling without a maintenance					72	
C. Inspection, maintenance or repair combined with refuelling				20		
D. Inspection, maintenance or repair without refuelling				456		
E. Testing of plant systems or components				0	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling	8760			551		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				31		
H. Nuclear regulatory requirements					2	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						1
L. Human factor related					2	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					32	
Subtotal	8760	0	0	1058	360	4
Total		8760			1422	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		18
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		5
14. Safety Systems		25
15. Reactor Cooling Systems		65
16. Steam generation systems		55
21. Fuel Handling and Storage Facilities		5
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System		19
41. Main Generator Systems		7
42. Electrical Power Supply Systems		6
Total	0	243

CN-2 GUANGDONG-1

Operator: GNPJVC (GUANGDONG NUCLEAR POWER JOINT VENTURE COMPANY LIMITED(GNPJVC))
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 944.0 MW(e)
Design Net Capacity: 930.0 MW(e)
Design Discharge Burnup: 35000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7328.5 GW(e).h
Energy Availability Factor: 89.0%
Load Factor: 88.6%
Operating Factor: 89.9%
Energy Unavailability Factor: 11.0%
Total Off-line Time: 884 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	701.7	634.1	702.0	679.7	698.4	678.3	696.0	692.9	669.7	468.6	18.5	688.4	7328.5
EAF (%)	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.5	2.9	97.5	89.0
UCF (%)	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	66.5	2.9	97.5	89.0
LF (%)	99.9	100.0	99.9	100.0	99.4	99.8	99.1	98.7	98.5	66.7	2.7	98.0	88.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	68.3	10.0	100.0	89.9
EUf (%)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	97.1	2.5	11.0
PUF (%)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.5	77.5	2.5	9.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.6	0.0	1.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1.CN2 WAS BASICALLY OPERATED IN BASE-LOAD MODE. 2.THERE WAS NO SCRAM IN 2010. 3.CN2 WAS BEARING ITS 14TH REFUELING OUTAGE FROM OCT.22.TO NOV.28, LASTING 36.91 DAYS.

5. Historical Summary

Date of Construction Start: 08 Jul 1987 **Lifetime Generation:** 116120.8 GW(e).h
Date of First Criticality: 28/07/1993 **Cumulative Energy Availability Factor:** 83.4%
Date of Grid Connection: 31/08/1993 **Cumulative Load Factor:** 83.5%
Date of Commercial Operation: 02 Jan 1994 **Cumulative Unit Capability Factor:** 87.2%
Cumulative Energy Unavailability Factor: 16.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	5808.2	944	77.4	77.4	76.3	76.3	76.8	76.8	6385	79.7
1995	3723.6	944	84.6	81.2	46.2	60.6	45.0	60.2	4088	46.7
1996	6252.7	944	76.8	79.7	76.0	65.9	75.4	65.4	6847	77.9
1997	6491.2	944	82.1	80.3	74.6	68.1	78.5	68.8	7272	83.0
1998	6040.5	944	79.6	80.1	72.0	68.9	73.0	69.6	7344	83.8
1999	6723.7	944	87.7	81.4	82.7	71.2	81.3	71.6	7680	87.7
2000	6986.6	944	85.4	82.0	85.2	73.3	84.3	73.4	7641	87.0
2001	7009.3	944	87.5	82.7	84.8	74.7	84.8	74.9	7619	87.0
2002	7387.2	944	89.6	83.5	89.5	76.4	89.3	76.5	7924	90.5
2003	7400.8	944	90.9	84.2	90.4	77.8	89.5	77.8	7958	90.8
2004	7540.9	944	88.5	84.6	88.2	78.7	90.9	79.0	7789	88.7
2005	8260.5	944	100.0	85.9	100.0	80.5	99.9	80.8	8760	100.0
2006	6635.1	944	79.9	85.4	79.9	80.5	80.2	80.7	7133	81.4
2007	7542.1	944	91.2	85.8	91.2	81.2	91.2	81.5	8074	92.2
2008	8255.5	944	99.8	86.8	99.7	82.5	99.6	82.7	8774	99.9
2009	7439.1	944	90.9	87.0	90.8	83.0	90.0	83.1	8055	92.0
2010	7328.5	944	89.0	87.2	89.0	83.4	88.6	83.5	7876	89.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		141			123	
C. Inspection, maintenance or repair combined with refuelling	744			853		
D. Inspection, maintenance or repair without refuelling				16		
E. Testing of plant systems or components					0	
J. Grid limitation, failure or grid unavailability					2	16
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						181
Subtotal	744	141	0	869	125	197
Total		885			1191	

7. Equipment Related Full Outages, Analysis by System

System	2010	1994 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems	141	0
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		18
33. Circulating Water System		3
41. Main Generator Systems		57
42. Electrical Power Supply Systems		26
Total	141	120

CN-3 GUANGDONG-2

Operator: GNPJVC (GUANGDONG NUCLEAR POWER JOINT VENTURE COMPANY LIMITED(GNPJVC))
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 944.0 MW(e)
 Design Net Capacity: 930.0 MW(e)
 Design Discharge Burnup: 35000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7685.6 GW(e).h
 Energy Availability Factor: 92.5%
 Load Factor: 92.9%
 Operating Factor: 93.6%
 Energy Unavailability Factor: 7.5%
 Total Off-line Time: 563 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	710.1	641.7	709.9	501.5	288.3	682.3	700.2	696.8	674.5	698.7	674.6	707.1	7685.6
EAF (%)	99.9	100.0	100.0	72.4	38.8	100.0	100.0	100.0	99.9	100.0	100.0	99.9	92.5
UCF (%)	99.9	100.0	100.0	72.4	38.8	100.0	100.0	100.0	99.9	100.0	100.0	99.9	92.5
LF (%)	101.1	101.2	101.1	73.8	41.0	100.4	99.7	99.2	99.2	99.5	99.2	100.7	92.9
OF (%)	100.0	100.0	100.0	73.8	49.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.6
EUf (%)	0.1	0.0	0.0	27.6	61.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	7.5
PUf (%)	0.1	0.0	0.0	27.6	61.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	7.5
UCLF (%)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1. CN3 WAS BASICALLY OPERATED IN BASE-LOAD MODE. 2. THERE WAS NO SCRAM IN 2010. 3. CN3 WAS BEARING ITS 14TH REFUELING OUTAGE FROM APR.23.TO MAY.16.2010, LASTING 23.46 DAYS.

5. Historical Summary

Date of Construction Start: 04 Jul 1988 Lifetime Generation: 114642.1 GW(e).h
 Date of First Criticality: 21/01/1994 Cumulative Energy Availability Factor: 83.6%
 Date of Grid Connection: 02 Jul 1994 Cumulative Load Factor: 83.5%
 Date of Commercial Operation: 05 Jul 1994 Cumulative Unit Capability Factor: 85.3%
 Cumulative Energy Unavailability Factor: 16.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	5014.2	944	99.4	99.4	92.3	92.3	90.3	90.3	5761	98.0
1995	6343.3	944	81.1	88.4	77.5	83.4	76.7	82.2	7146	81.6
1996	5276.9	944	67.4	80.6	63.9	76.1	63.6	75.2	5740	65.3
1997	5914.8	944	70.1	77.7	67.4	73.8	71.5	74.2	6194	70.7
1998	6259.1	944	82.9	78.8	74.7	74.0	75.7	74.5	7302	83.4
1999	6789.5	944	86.2	80.1	83.3	75.6	82.1	75.9	7594	86.7
2000	6995.5	944	89.1	81.5	88.4	77.5	84.4	77.1	7840	89.3
2001	7355.5	944	91.1	82.7	89.5	79.1	88.9	78.7	7986	91.2
2002	6728.9	944	82.2	82.7	81.6	79.4	81.4	79.0	7224	82.5
2003	6983.1	944	84.6	82.9	84.5	79.9	84.4	79.6	7503	85.7
2004	6358.9	944	74.4	82.1	74.2	79.4	76.7	79.3	6580	74.9
2005	6587.0	944	79.6	81.9	79.6	79.4	79.7	79.3	7075	80.8
2006	8222.8	944	99.9	83.3	99.9	81.0	99.4	80.9	8760	100.0
2007	7344.2	944	88.8	83.7	88.8	81.6	88.8	81.5	7858	89.7
2008	7174.4	944	86.3	83.9	86.3	81.9	86.5	81.8	7667	87.3
2009	8222.6	944	100.0	84.9	100.0	83.1	99.4	82.9	8760	100.0
2010	7685.6	944	92.5	85.3	92.5	83.6	92.9	83.5	8197	93.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					160	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	563			849		
D. Inspection, maintenance or repair without refuelling				16		
J. Grid limitation, failure or grid unavailability						19
L. Human factor related					20	
Subtotal	563	0	0	865	183	19
Total		563			1067	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1994 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		7
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		63
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		2
35. All other I&C Systems		2
41. Main Generator Systems		55
42. Electrical Power Supply Systems		24
Total	0	156

CN-6 LINGAO 1

Operator: LANPC (LINGAO NUCLEAR POWER COMPANY LTD.)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 938.0 MW(e)
 Design Net Capacity: 938.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7714.6 GW(e).h
 Energy Availability Factor: 93.6%
 Load Factor: 93.9%
 Operating Factor: 94.6%
 Energy Unavailability Factor: 6.4%
 Total Off-line Time: 472 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	706.8	243.5	580.6	685.5	691.7	680.1	698.4	695.7	663.1	684.7	681.9	702.7	7714.6
EAF (%)	100.0	39.1	81.8	99.9	98.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.6
UCF (%)	100.0	39.8	81.8	99.9	98.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.7
LF (%)	101.3	38.6	83.2	101.5	99.1	100.7	100.1	99.7	98.2	98.1	101.0	100.7	93.9
OF (%)	100.0	39.9	90.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.6
EUf (%)	0.0	60.9	18.2	0.1	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4
PUf (%)	0.0	60.2	18.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
UCLF (%)	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
XUF (%)	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1. CN6 WAS BASICALLY OPERATED IN BASE-LOAD MODE. 2. THERE WAS NO SCRAM IN 2010. 3. BY THE REQUEST OF GRID SYSTEM,CN6 WAS DELOADED DURING THE YEAR. 4. CN6 WAS BEARING ITS 8TH REFUELING OUTAGE FROM FEB.12. TO MAR.03, LASTING 19.7 DAYS.

5. Historical Summary

Date of Construction Start: 15/05/1997
 Date of First Criticality: 02 Apr 2002
 Date of Grid Connection: 26/02/2002
 Date of Commercial Operation: 28/05/2002

Lifetime Generation: 62093.6 GW(e).h
 Cumulative Energy Availability Factor: 88.3%
 Cumulative Load Factor: 86.5%
 Cumulative Unit Capability Factor: 88.7%
 Cumulative Energy Unavailability Factor: 11.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	4583.8	938	95.7	95.7	95.7	95.7	83.1	83.1	5184	88.1
2003	6375.0	938	82.3	87.7	80.4	86.5	77.6	79.8	7215	82.4
2004	7331.4	938	89.0	88.2	88.7	87.3	89.0	83.2	7884	89.8
2005	6906.4	938	84.3	87.1	84.3	86.5	84.1	83.5	7424	84.7
2006	7401.0	938	90.1	87.7	90.1	87.3	90.1	84.9	7964	90.9
2007	6835.0	938	83.2	86.9	83.2	86.6	83.2	84.6	7345	83.8
2008	7542.9	938	92.1	87.7	91.2	87.3	91.5	85.6	8163	92.9
2009	7002.5	938	90.4	88.1	90.3	87.7	85.2	85.6	7997	91.3
2010	7714.6	938	93.7	88.7	93.6	88.3	93.9	86.5	8288	94.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure C. Inspection, maintenance or repair combined with refuelling	477			779	142	
Subtotal	477	0	0	779	142	0
Total	477			921		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2003 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		3
15. Reactor Cooling Systems		72
16. Steam generation systems		5
42. Electrical Power Supply Systems		62
Total	0	142

CN-7 LINGAO 2

Operator: LANPC (LINGAO NUCLEAR POWER COMPANY LTD.)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 938.0 MW(e)
 Design Net Capacity: 938.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7505.5 GW(e).h
 Energy Availability Factor: 90.8%
 Load Factor: 91.3%
 Operating Factor: 92.6%
 Energy Unavailability Factor: 9.2%
 Total Off-line Time: 648 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	553,7	606,7	705,3	683,3	702,6	676,3	697,5	698,5	675,0	685,4	682,0	139,3	7505,5
EAF (%)	77,7	99,3	99,5	99,5	99,1	99,0	99,1	100,0	100,0	99,9	100,0	18,9	90,8
UCF (%)	77,7	99,3	99,5	99,5	99,1	99,0	99,1	100,0	100,0	99,9	100,0	18,9	90,8
LF (%)	79,3	96,2	101,1	101,2	100,7	100,1	99,9	100,1	100,0	98,2	101,0	20,0	91,3
OF (%)	86,8	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	26,1	92,6
EUf (%)	22,3	0,7	0,5	0,5	0,9	1,0	0,9	0,0	0,0	0,1	0,0	81,1	9,2
PUF (%)	22,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	79,2	8,6
UCLF (%)	0,0	0,7	0,5	0,5	0,9	1,0	0,8	0,0	0,0	0,0	0,0	1,9	0,5
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1. CN7 WAS BASICALLY OPERATED IN BASE-LOAD MODE. 2. THERE WAS NO SCRAM IN 2010. 3. CN7 WAS BEARING ITS 7 REFUELING OUTAGE FROM DEC.13.2009 TO JAN.05.2010, LASTING 22.94 DAYS, AND ITS 8TH REFUELING OUTAGE FROM DEC.07 TO DEC.30, LASTING 22.94 DAYS.

5. Historical Summary

Date of Construction Start: 28/11/1997 Lifetime Generation: 58088.0 GW(e).h
 Date of First Criticality: 27/08/2002 Cumulative Energy Availability Factor: 88.5%
 Date of Grid Connection: 15/12/2002 Cumulative Load Factor: 88.2%
 Date of Commercial Operation: 01 Aug 2003 Cumulative Unit Capability Factor: 88.6%
 Cumulative Energy Unavailability Factor: 11.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2003	6934,9	938	90,6	90,6	89,9	89,9	84,4	84,4	7494	85,5
2004	6669,4	938	79,9	85,2	79,8	84,9	80,9	82,7	7109	80,9
2005	7530,9	938	91,6	87,3	91,3	87,0	91,7	85,7	8075	92,2
2006	7661,0	938	92,1	88,5	92,1	88,3	93,2	87,6	8164	93,2
2007	7215,1	938	87,8	88,4	87,8	88,2	87,8	87,6	7796	89,0
2008	7077,1	938	85,2	87,8	85,2	87,7	85,9	87,3	7577	86,3
2009	7433,8	938	90,9	88,3	90,9	88,1	90,5	87,8	8052	91,9
2010	7505,5	938	90,8	88,6	90,8	88,5	91,3	88,2	8112	92,6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					46	
C. Inspection, maintenance or repair combined with refuelling	649			780		
L. Human factor related					0	
Subtotal	649	0	0	780	46	0
Total		649			826	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2003 to 2010 Average Hours Lost Per Year
32. Feedwater and Main Steam System		5
41. Main Generator Systems		40
Total	0	45

CN-12 LINGAO 3

Operator: LDNPC (Lingdong Nuclear Power Company Ltd.)

Contractor: DFEC (Dongfang Electric Corporation)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1000.0 MW(e)
Design Net Capacity: 1000.0 MW(e)
Design Discharge Burnup: —
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1828.5 GW(e).h
Energy Availability Factor: 77.5%
Load Factor: 62.4%
Operating Factor: 64.3%
Energy Unavailability Factor: 22.5%
Total Off-line Time: 1044 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h									348,9	0,0	716,2	763,4	1828,5
EAF (%)									67,5	45,9	96,9	100,0	77,5
UCF (%)									67,5	45,9	96,9	100,0	77,5
LF (%)									48,5	0,0	99,5	102,6	62,4
OF (%)									55,0	3,2	100,0	100,0	64,3
EUUF (%)									32,5	54,1	3,1	0,0	22,5
PUF (%)									32,5	52,4	0,4	0,0	21,4
UCLF (%)									0,0	1,8	2,7	0,0	1,1
XUF (%)									0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1.CN12 CONNECTED WITH GRID FIRSTLY ON JUL 15,2010 AND WAS COMMERCIAL OPERATION ON SEP 15,2010.2.CN12 WAS BEARED THE PREPARING OUTAGE FROM SEP 22 TO OCT 31.3.CN12 WAS BASICALLY OPERATED IN BASE-LOAD MODE.4.THERE WAS ONE SCRAM ON 14.7%PN IN 2010.

5. Historical Summary

Date of Construction Start: 15/12/2005
Date of First Criticality: 06 Sep 2010
Date of Grid Connection: 15/07/2010
Date of Commercial Operation: 15/09/2010

Lifetime Generation: 1647.5 GW(e).h
Cumulative Energy Availability Factor: 77.5%
Cumulative Load Factor: 62.4%
Cumulative Unit Capability Factor: 77.5%
Cumulative Energy Unavailability Factor: 22.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2010	1828,5	1000	77,5	77,5	77,5	77,5	62,4	62,4	1884	64,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2010 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External

The reactor has not yet completed a full year of commercial operation.

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2010 to 2010 Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

CN-1 QINSHAN 1

Operator: QNPC (QINSHAN NUCLEAR POWER COMPANY)
Contractor: CNNC (CHINA NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 288.0 MW(e)
Design Net Capacity: 288.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2169.3 GW(e).h
Energy Availability Factor: 83.2%
Load Factor: 84.3%
Operating Factor: 84.5%
Energy Unavailability Factor: 16.8%
Total Off-line Time: 1362 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	218,9	175,9	220,6	212,3	219,7	213,0	8,7	16,0	206,0	225,5	222,5	230,1	2169,3
EAF (%)	99,6	100,0	100,0	99,8	100,0	99,1	4,2	7,6	96,1	99,1	99,9	100,0	83,2
UCF (%)	99,6	100,0	100,0	99,8	100,0	100,0	4,2	7,6	96,2	99,1	99,9	100,0	83,3
LF (%)	102,1	90,9	103,0	102,4	102,5	99,3	3,9	7,2	96,0	101,7	103,7	103,8	84,3
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	4,8	12,1	100,0	100,0	100,0	100,0	84,5
EUf (%)	0,4	0,0	0,0	0,2	0,0	0,9	95,8	92,4	3,9	0,9	0,1	0,0	16,8
PUF (%)	0,2	0,0	0,0	0,2	0,0	0,0	95,8	24,9	2,4	0,0	0,1	0,0	10,6
UCLF (%)	0,2	0,0	0,0	0,0	0,0	0,0	0,0	67,5	1,4	1,0	0,0	0,0	6,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,9	0,0	0,0	0,1	0,0	0,0	0,0	0,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE 12TH REFUELING OUTAGE WAS FROM 2 TH JUL.2010 TO 30TH AUG 2010.POWER OPERATION DURATION WAS 308 DAYS. ONE REACTOR SCRAM OPERATED DURING THIS YEAR.THE UNIT OPERATED A REDUCED ELECTRIC LOAD OF 200 MWE FROM 11:00 ON 11TH FEB. TO 18:15 ON 19TH FEB. FOR LOAD-FOLLOWING REQUISITION DURING SPRING FESTIVAL.AT 11:51 ON 2 TH JUL ,THE UNIT DISCONNECTED GRID FOR THE 12TH REFUELINGOUTAGE.AT 18:48 ON 27TH AUG, THE UNIT SYNCHRONIZED THE GRID.AND OPERATED AT FULL POWER SINCE 19:05 ON 2 TH SEP.AT 03:11 ON 30TH AUG 2010,THE TUBINE TRIPED BECAUSE OF THE ACTION OF GENERATOR 95% GROUNDING SAFETY SIGNAL.IT CAUSED REACTOR SCRAM.AT 18:42 ON 30TH AUG THE UNIT SYNCHRONIZED THE GRID AND OPERATED AT FULL POWER SINCE 19:05 ON 2 TH SEP.

5. Historical Summary

Date of Construction Start: 20/03/1985 **Lifetime Generation:** 35690.5 GW(e).h
Date of First Criticality: 31/10/1991 **Cumulative Energy Availability Factor:** 78.2%
Date of Grid Connection: 15/12/1991 **Cumulative Load Factor:** 79.3%
Date of Commercial Operation: 04 Jän 1994 **Cumulative Unit Capability Factor:** 79.8%
Cumulative Energy Unavailability Factor: 21.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	1153,9	279	67,5	67,5	62,0	62,0	62,7	62,7	4624	70,1
1995	2063,9	300	86,8	78,8	82,3	74,0	78,5	72,0	7886	90,0
1996	2073,7	279	81,2	79,7	81,2	76,5	84,6	76,5	7479	85,1
1997	2011,7	300	81,8	80,2	76,1	76,4	76,5	76,5	7185	82,0
1998	1149,5	279	48,8	73,8	42,6	69,5	47,0	70,5	4331	49,4
1999	680,9	279	27,8	66,0	27,8	62,4	27,9	63,3	2519	28,8
2000	2035,5	300	77,6	67,8	77,6	64,8	77,2	65,4	6840	77,9
2001	2319,4	279	93,5	71,0	92,8	68,3	94,9	69,1	8370	95,5
2002	1783,2	279	69,2	70,8	66,3	68,1	73,0	69,5	5989	68,4
2003	2256,6	288	88,5	72,6	88,4	70,2	89,4	71,6	7798	89,0
2004	2565,2	288	99,8	75,2	99,1	72,9	101,4	74,4	8784	100,0
2005	2194,6	288	87,0	76,2	86,8	74,1	87,0	75,5	7693	87,8
2006	2310,4	288	91,8	77,4	91,8	75,5	91,6	76,7	8086	92,3
2007	2061,4	288	82,2	77,8	82,0	75,9	81,7	77,1	7218	82,4
2008	2430,7	288	95,5	79,0	95,4	77,3	96,1	78,4	8434	96,0
2009	2195,4	288	87,4	79,5	87,3	77,9	87,0	78,9	7704	87,9
2010	2169,3	298	83,3	79,8	83,2	78,2	84,3	79,3	7398	84,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		494			50	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling	864			1017		
D. Inspection, maintenance or repair without refuelling				69		
E. Testing of plant systems or components					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					344	2
L. Human factor related					10	
Subtotal	864	494	0	1086	412	2
Total		1358			1500	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1993 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	487	
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems		0
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System		13
33. Circulating Water System		4
35. All other I&C Systems		1
41. Main Generator Systems	7	2
XX. Miscellaneous Systems		2
Total	494	47

CN-4 QINSHAN 2-1

Operator: NPQJVC (NUCLEAR POWER PLANT QINSHAN JOINT VENTURE COMPANY LTD.)

Contractor: CNNC (CHINA NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 610.0 MW(e)
 Design Net Capacity: 610.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4985.4 GW(e).h
 Energy Availability Factor: 91.7%
 Load Factor: 93.3%
 Operating Factor: 92.4%
 Energy Unavailability Factor: 8.3%
 Total Off-line Time: 665 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	26,9	412,2	471,0	449,7	463,8	445,6	457,2	445,4	436,3	460,8	448,5	468,2	4985,4
EAF (%)	6,0	100,0	100,0	98,9	99,1	100,0	100,0	99,6	100,0	100,0	99,0	99,5	91,7
UCF (%)	6,0	100,0	100,0	98,9	99,1	100,0	100,0	99,6	100,0	100,0	99,0	99,5	91,7
LF (%)	5,9	100,5	103,8	102,4	102,2	101,5	100,7	98,1	99,3	101,5	102,1	103,2	93,3
OF (%)	10,6	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	92,4
EUf (%)	94,0	0,0	0,0	1,1	0,9	0,0	0,0	0,4	0,0	0,0	1,0	0,5	8,3
PUF (%)	94,0	0,0	0,0	0,0	0,9	0,0	0,0	0,4	0,0	0,0	0,3	0,0	8,1
UCLF (%)	0,0	0,0	0,0	1,1	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,5	0,2
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE IS NO UNPLANNED AUTOMATIC SCRAM FROM 2010-1-1 TO 2010-2-1 MAINTENANCE WITH REFUELING FROM 2010-2-12 TO 2010-2-17 OPERATING AT 575 MWE FOR GRID DEMAND FROM 2010-4-10 10:00 TO 2010-4-11 09:06, UNPLANNED POWER LOSS TO DEAL WITH THE LOW PRESSURE OF LUBRICATING OIL OF 1CRF002PO FROM 2010-5-8 02:00 TO 2010-5-8 22:00, TESTING OF TURBINE CONTROL VALVES FROM 2010-8-8 08:00 TO 2010-8-8 16:15, TESTING OF TURBINE CONTROL VALVES FROM 2010-10-11 11:00 TO 2010-10-3 16:50, OPERATING AT 610 MWE FOR GRID DEMAND FROM 2010-11-6 8:30 TO 2010-11-7 1:45, TESTING OF TURBINE CONTROL VALVES FROM 2010-12-29 17:00 TO 2010-12-30 5:40, UNPLANNED POWER LOSS TO DEAL WITH THE MALFUNCTION OF 1GRE003VV

5. Historical Summary

Date of Construction Start: 06 Feb 1996 Lifetime Generation: 37519.1 GW(e).h
 Date of First Criticality: 15/11/2001 Cumulative Energy Availability Factor: 79.1%
 Date of Grid Connection: 02 Jun 2002 Cumulative Load Factor: 79.6%
 Date of Commercial Operation: 18/04/2002 Cumulative Unit Capability Factor: 79.1%
 Cumulative Energy Unavailability Factor: 20.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	2965,3	610	81,6	81,6	81,6	81,6	73,6	73,6	4631	70,2
2003	4327,3	610	81,0	81,2	80,9	81,2	81,0	77,8	7123	81,3
2004	4395,7	610	80,1	80,8	80,1	80,8	82,0	79,4	7117	81,0
2005	4944,8	610	90,6	83,4	90,6	83,4	92,5	82,9	7982	91,1
2006	2938,2	610	55,2	77,5	55,2	77,5	55,0	77,0	4890	55,8
2007	3503,0	610	64,1	75,2	64,1	75,2	65,6	75,0	5681	64,9
2008	4677,6	610	85,4	76,7	85,2	76,7	87,3	76,8	7554	86,0
2009	4501,0	610	82,7	77,5	82,7	77,4	84,2	77,8	7256	82,8
2010	4985,4	610	91,7	79,1	91,7	79,1	93,3	79,6	8095	92,4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					143	
C. Inspection, maintenance or repair combined with refuelling	664			1063		
D. Inspection, maintenance or repair without refuelling				13		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				491		
Z. Others					18	
Subtotal	664	0	0	1567	161	0
Total		664			1728	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2003 to 2010 Average Hours Lost Per Year
13. Reactor Auxiliary Systems		90
21. Fuel Handling and Storage Facilities		3
31. Turbine and auxiliaries		24
32. Feedwater and Main Steam System		0
41. Main Generator Systems		25
Total	0	142

CN-5 QINSHAN 2-2

Operator: NPQJVC (NUCLEAR POWER PLANT QINSHAN JOINT VENTURE COMPANY LTD.)
 Contractor: CNNC (CHINA NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 610.0 MW(e)
 Design Net Capacity: 610.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4715.0 GW(e).h
 Energy Availability Factor: 86.6%
 Load Factor: 88.2%
 Operating Factor: 87.3%
 Energy Unavailability Factor: 13.4%
 Total Off-line Time: 1115 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	457,2	411,4	469,9	455,6	213,5	42,4	457,8	448,3	436,1	457,7	453,8	411,4	4715,0
EAf (%)	97,5	100,0	100,0	100,0	45,3	10,0	100,0	100,0	99,7	99,8	100,0	87,6	86,6
UCF (%)	97,5	100,0	100,0	100,0	45,3	10,0	100,0	100,0	99,7	99,8	100,0	87,6	86,6
LF (%)	100,7	100,4	103,5	103,7	47,0	9,7	100,9	98,8	99,3	100,9	103,3	90,7	88,2
OF (%)	97,8	100,0	100,0	100,0	45,4	16,9	100,0	100,0	100,0	100,0	100,0	87,2	87,3
EUF (%)	2,5	0,0	0,0	0,0	54,7	90,0	0,0	0,0	0,3	0,2	0,0	12,4	13,4
PUF (%)	0,0	0,0	0,0	0,0	54,7	88,3	0,0	0,0	0,3	0,0	0,0	12,4	13,0
UCLF (%)	2,5	0,0	0,0	0,0	0,0	1,7	0,0	0,0	0,0	0,2	0,0	0,0	0,4
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE IS ONE UNPLANNED AUTOMATIC SCRAM IN 2010 YEAR 2010-1-13 4:40, UNIT 2 TURBINE TRIP INITIATED BY SPURIOUS SIGNAL P4 AND THEN REACTOR AUTOMATIC SCRAM DUE TO MALFUNCTION OF 2ADG101VV. FROM 2010-2-12 TO 2010-2-17 LOAD FOLLOWING, OPERATING AT 575MWE FOR GRID DEMAND.FROM 2010-5-15 TO 2010-6-30 , MAINTENANCE WITH 206 REFUELING OUTAGE.FROM 2010-9-25 08:30 TO 2010-9-25 15:30, TESTING OF TURBINE CONTROL VALVESFROM 2010-10-1 11:00 TO 2010-10-3 17:40, OPERATING AT 610 MWE FOR GRID DEMAND.FROM 2010-10-13 8:30 TO 2010-10-13 14:05 , UNPLANNED POWER LOSS TO DEAL WITH THE MALFUNCTION OF 2GSE002VV.FROM 2010-12-19 20:15 TO 2010-12-23 20:30 PLANNED OUTAGE TO DEAL WITH THE HEAT EXCHANGER MALFUNCTION OF SRI SYSTEM.

5. Historical Summary

Date of Construction Start: 04 Jan 1997 Lifetime Generation: 32031.7 GW(e).h
 Date of First Criticality: 25/02/2004 Cumulative Energy Availability Factor: 87.6%
 Date of Grid Connection: 03 Nov 2004 Cumulative Load Factor: 89.1%
 Date of Commercial Operation: 05 Mär 2004 Cumulative Unit Capability Factor: 87.6%
 Cumulative Energy Unavailability Factor: 12.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2004	3514,3	610	96,2	96,2	96,2	96,2	98,0	98,0	5682	96,6
2005	4521,5	610	82,8	88,2	82,7	88,1	84,6	90,0	7331	83,7
2006	4790,4	610	88,8	88,4	88,8	88,4	89,6	89,9	7822	89,3
2007	4817,0	610	88,3	88,4	88,3	88,4	90,1	89,9	7792	88,9
2008	4635,5	610	85,2	87,7	84,9	87,6	86,5	89,2	7545	85,9
2009	4787,8	610	88,2	87,8	88,2	87,7	89,6	89,3	7821	89,3
2010	4715,0	610	86,6	87,6	86,6	87,6	88,2	89,1	7645	87,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2004 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		21			24	
C. Inspection, maintenance or repair combined with refuelling	998			746		
D. Inspection, maintenance or repair without refuelling				54		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	88					
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	1086	21	0	800	24	2
Total		1107			826	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2004 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems	15	
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries	5	16
32. Feedwater and Main Steam System		0
42. Electrical Power Supply Systems		3
Total	20	22

CN-14 QINSHAN 2-3

Operator: NPQJVC (NUCLEAR POWER PLANT QINSHAN JOINT VENTURE COMPANY LTD.)

Contractor: CNNC (CHINA NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 610.0 MW(e)
 Design Net Capacity: 610.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1301.8 GW(e).h
 Energy Availability Factor: 94.7%
 Load Factor: 96.7%
 Operating Factor: 97.6%
 Energy Unavailability Factor: 5.3%
 Total Off-line Time: 54 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h										455,5	376,0	470,4	1301,8
EAF (%)										99,9	84,0	100,0	94,7
UCF (%)										99,9	84,0	100,0	94,7
LF (%)										100,4	85,6	103,6	96,7
OF (%)										100,0	92,5	100,0	97,6
EUf (%)										0,1	16,0	0,0	5,3
PUF (%)										0,1	0,0	0,0	0,0
UCLF (%)										0,0	16,0	0,0	5,2
XUF (%)										0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

2010-7-13 22:40 FIRST CRITICAL OF UNIT 3 2010-08-01 23:59, FIRST CONNECTED TO THE GRID. 2010-10-5, PUT INTO COMMERCIAL OPERATION. THE UNIT OPERATION AFTER THE COMMERCIAL OPERATION IS AS FOLLOWS: 1. 2010-11-03 18:00-2010-11-07 12:30, THE UNIT REDUCED POWER TO 295MWE, DEALING WITH THE MAIN FEED-WATER PUMP APA302PO BEARING HIGH TEMPERATURE DEFECTS. 2. 2010-11-12, IC PERSONNEL PERFORMED T3 TEST. AT 12:29, THE TEST SWITCH DEFICIENCY RESULTED IN TURBINE TRIP. 10 SECONDS LATER, THE SIGNAL OF CONDENSATE WATER PRESSURE WAS FAULT, SO THAT CONDENSER FAILURE SIGNAL TRIGGERED. REACTOR TRIPPED DUE TO COINCIDENCE OF P10, C8 AND CONDENSER FAILURE SIGNAL. 3. 2010-11-13 14:25, THE UNIT WAS CONNECTED TO THE GRID. WHEN RAISING THE POWER, THE CUSHION OF 1# LOW-PRESSURE CYLINDER INTAKE-PIPE LEAKED AND TRIPPED THE TURBINE TO TREAT WITH THE DEFECT. 4. 2010-11-15 2:18, THE UNIT WAS RECONNECTED TO THE GRID.

5. Historical Summary

Date of Construction Start: 28/03/2006 Lifetime Generation: 1465.2 GW(e).h
 Date of First Criticality: 13/07/2010 Cumulative Energy Availability Factor: 94.7%
 Date of Grid Connection: 08 Jan 2010 Cumulative Load Factor: 96.7%
 Date of Commercial Operation: 21/10/2010 Cumulative Unit Capability Factor: 94.7%
 Cumulative Energy Unavailability Factor: 5.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2010	1301,8	610	94,7	94,7	94,7	94,7	96,7	96,7	2154	97,6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2010 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External

The reactor has not yet completed a full year of commercial operation.

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2010 to 2010 Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

CN-8 QINSHAN 3-1

Operator: TQNPC (The Third Qinshan Jointed Venture Company Ltda.)

Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUF at the beginning of 2010): 650.0 MW(e)
 Design Net Capacity: 650.0 MW(e)
 Design Discharge Burnup: 7186 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5216.3 GW(e).h
 Energy Availability Factor: 89.7%
 Load Factor: 91.6%
 Operating Factor: 90.0%
 Energy Unavailability Factor: 10.3%
 Total Off-line Time: 876 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	496.2	446.2	504.2	487.6	162.0	275.5	482.8	475.0	465.3	497.6	487.0	437.1	5216.3
EAFF (%)	100.0	100.0	100.0	100.0	32.4	58.5	100.0	100.0	99.7	100.0	100.0	87.0	89.7
UCF (%)	100.0	100.0	100.0	100.0	32.4	58.5	100.0	100.0	99.7	100.0	100.0	87.0	89.7
LF (%)	102.6	102.1	104.3	104.2	33.5	58.9	99.8	98.2	99.4	102.9	104.1	90.4	91.6
OF (%)	100.0	100.0	100.0	100.0	32.3	61.4	100.0	100.0	100.0	100.0	100.0	87.4	90.0
EUFF (%)	0.0	0.0	0.0	0.0	67.6	41.5	0.0	0.0	0.3	0.0	0.0	13.0	10.3
PUFF (%)	0.0	0.0	0.0	0.0	67.6	41.5	0.0	0.0	0.0	0.0	0.0	13.0	10.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
XUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1. AS PER THE GRID ARRANGEMENT, THE UNIT POWER WAS DROPPED DOWN TO 89% AT 00:00 FEBRUARY 13 TO 18:00 ON FEBRUARY 15.2. AT 00:00 ON MAY 11 THE UNIT BEGAN TO LOWER POWER AND DISCONNECTED FROM THE GRID FOR THE 5TH PLANNED MAINTENANCE OUTAGE. THE UNIT CONNECTED TO GRID AT 13:46 ON JUNE 12 AND REACHED FULL POWER OPERATION AT 12:46 ON JUNE 14 AFTER THE PLANNED OUTAGE.
 3. THE UNIT POWER DERATED TO 84%FP AT 01:49 ON SEPTEMBER 26 DUE TO HUMAN OPERATION ERRORS AND RETURN TO FULL POWER AT 14:27 ON THE SAME DAY. 4. AT 13:34 ON NOVEMBER 23, UNIT 1 LZC BALANCE HEADER DIFFERENTIAL PRESSURE CONTROLLER B FAILED WHICH CAUSED LZC AVERAGE LEVEL FLUCTUATED THE UNIT POWER WAS DECREASED TO 90%. THE UNIT RETURNED TO FULL POWER OPERATION AT 14:47 ON THE SAME DAY. 5. UNIT SHUTDOWN FOR MINI MAINTENANCE OUTAGE FROM 21:00 OF DEC.27.

5. Historical Summary

Date of Construction Start: 06 Aug 1998 Lifetime Generation: 41151.0 GW(e).h
 Date of First Criticality: 21/09/2002 Cumulative Energy Availability Factor: 87.5%
 Date of Grid Connection: 19/11/2002 Cumulative Load Factor: 89.6%
 Date of Commercial Operation: 31/12/2002 Cumulative Unit Capability Factor: 87.9%
 Cumulative Energy Unavailability Factor: 12.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002			Data not provided							
2003	5174.7	650	89.7	89.7	86.6	86.6	90.9	90.9	7977	91.1
2004	4405.5	650	75.6	82.6	75.6	81.1	77.2	84.0	6745	76.8
2005	4781.6	650	82.5	82.6	82.4	81.5	84.0	84.0	7249	82.8
2006	5577.8	650	96.3	86.0	96.3	85.2	98.0	87.5	8484	96.8
2007	5020.4	650	86.4	86.1	86.4	85.5	88.2	87.6	7597	86.7
2008	5328.6	650	91.2	87.0	91.1	86.4	93.3	88.6	8051	91.7
2009	5326.2	650	91.9	87.7	91.9	87.2	93.5	89.3	8076	92.2
2010	5216.3	650	89.7	87.9	89.7	87.5	91.6	89.6	7884	90.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure D. Inspection, maintenance or repair without refuelling	864			765	129	
Subtotal	864	0	0	765	129	0
Total		864			894	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2003 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		16
15. Reactor Cooling Systems		37
32. Feedwater and Main Steam System		4
42. Electrical Power Supply Systems		62
Total	0	128

CN-9 QINSHAN 3-2

Operator: TQNPC (The Third Qinshan Jointed Venture Company Ltda.)

Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type:	PHWR
Net Reference Unit Power (RUF) at the beginning of 2010:	650.0 MW(e)
Design Net Capacity:	650.0 MW(e)
Design Discharge Burnup:	7186 MW.d/t
Status at end of year:	Operational

2. Production Summary 2010

Net Energy Production:	5341.5 GW(e).h
Energy Availability Factor:	92.1%
Load Factor:	93.8%
Operating Factor:	92.5%
Energy Unavailability Factor:	7.9%
Total Off-line Time:	661 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	140,4	339,0	502,6	486,3	496,6	471,3	481,4	473,3	465,8	496,4	486,8	501,6	5341,5
EAF (%)	28,0	76,3	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	92,1
UCF (%)	28,0	76,4	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	92,1
LF (%)	29,0	77,6	103,9	103,9	102,7	100,7	99,5	97,9	99,5	102,6	104,0	103,7	93,8
OF (%)	31,5	77,5	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	92,5
EUf (%)	72,0	23,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	7,9
PUF (%)	72,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	6,1
UCLF (%)	0,0	23,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,8
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1.THE UNIT CONNECTED TO GRID AT 05:52 ON JANUARY 22 AND REACHED FULL POWER OPERATION AT 17:28 ON JANUARY 24 AFTER THE 4TH PLANNED MAINTENANCE OUTAGE.2.AS PER THE GRID ARRANGEMENT, THE UNIT POWER WAS DROPPED AND OPERATED AT 86% FROM 11:30 ON FEBRUARY 12 TO 18:00 ON FEBRUARY 15.3.THE UNIT WAS SHUTDOWN AT 21:51 ON FEB.18 TO DEAL WITH HPECI GAS ISOLATION VALVES(3432-PV81/82) FAILURE ,UNIT RECONNECTED TO GRID AT 4:15 ON FEB.25 AND RETURNED TO FULL POWER OPERATION AT 2:33 ON FEB.26.4.THE UNIT POWER WAS DECREASED TO 95%FP AT 23:00 ON OCTOBER 28 DUE TO CONDENSER 2A OCCURRED LEAKAGE AND RETURN TO FULL POWER AT 04:00 ON OCTOBER 29.

5. Historical Summary

Date of Construction Start:	25/09/1998	Lifetime Generation:	38745.5 GW(e).h
Date of First Criticality:	18/01/2003	Cumulative Energy Availability Factor:	90.2%
Date of Grid Connection:	06 Dez 2003	Cumulative Load Factor:	91.2%
Date of Commercial Operation:	24/07/2003	Cumulative Unit Capability Factor:	90.3%
		Cumulative Energy Unavailability Factor:	9.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2003			Data not provided							
2004	5358,6	665	93,0	93,0	92,4	92,4	91,7	91,7	8236	93,8
2005	4604,6	665	80,2	86,6	80,1	86,3	79,0	85,4	7014	80,1
2006	5038,2	650	86,7	86,7	86,7	86,4	88,5	86,4	7721	88,1
2007	5675,7	650	97,6	89,3	97,6	89,2	99,7	89,7	8559	97,7
2008	5083,4	650	87,3	88,9	87,2	88,8	89,0	89,6	7697	87,6
2009	5523,7	650	95,4	90,0	95,4	89,9	97,0	90,8	8359	95,4
2010	5341,5	650	92,1	90,3	92,1	90,2	93,8	91,2	8099	92,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2004 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		172			28	
D. Inspection, maintenance or repair without refuelling	509			675		
L. Human factor related					13	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
Subtotal	509	172	0	675	41	6
Total		681			722	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2004 to 2010 Average Hours Lost Per Year
14. Safety Systems	172	
16. Steam generation systems		7
32. Feedwater and Main Steam System		9
42. Electrical Power Supply Systems		11
Total	172	27

CN-10 TIANWAN 1

Operator: JNPC (Jiangsu Nuclear Power Corporation)

Contractor: IZ (Izhorskiye Zavody)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 933.0 MW(e)
Design Net Capacity: 933.0 MW(e)
Design Discharge Burnup: —
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7539.6 GW(e).h
Energy Availability Factor: 87.0%
Load Factor: 92.2%
Operating Factor: 87.2%
Energy Unavailability Factor: 13.0%
Total Off-line Time: 1117 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	740,8	663,8	402,3	0,0	662,8	703,8	731,4	731,8	713,3	738,6	717,0	734,0	7539,6
EAF (%)	100,0	100,0	54,4	0,0	89,6	100,0	100,0	100,0	100,0	100,0	100,0	100,0	87,0
UCF (%)	100,0	100,0	54,4	0,0	89,6	100,0	100,0	100,0	100,0	100,0	100,0	100,0	87,0
LF (%)	106,7	105,9	58,0	0,0	95,5	104,8	105,4	105,4	106,2	106,4	106,7	105,7	92,2
OF (%)	100,0	100,0	55,0	0,0	91,7	100,0	100,0	100,0	100,0	100,0	100,0	100,0	87,2
EUF (%)	0,0	0,0	45,6	100,0	10,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,0
PUF (%)	0,0	0,0	45,6	100,0	10,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	13,0
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT 1 REMAINED IN FULL POWER OPERATION EXCEPT ONE REFUELLING OUTAGE THIS YEAR. NO AUTOMATIC OR MANUAL SCRAM EVENT OCCURRED: AT 15:08 ON 17 MARCH, THE UNIT POWER BEGAN TO DECREASE. AT 00:59 ON 18 MARCH, THE UNIT WAS SHUT DOWN, THE GENERATOR WAS DISCONNECTED FROM THE GRID, AND T103 REFUELLING OUTAGE STARTED. AT 14:15 ON 3 MAY, THE UNIT WAS CONNECTED TO THE GRID AND T103 REFUELLING OUTAGE ENDED.

5. Historical Summary

Date of Construction Start: 20/10/1999 **Lifetime Generation:** 26539.0 GW(e).h
Date of First Criticality: 20/12/2005 **Cumulative Energy Availability Factor:** 78.7%
Date of Grid Connection: 05 Dez 2006 **Cumulative Load Factor:** 82.2%
Date of Commercial Operation: 17/05/2007 **Cumulative Unit Capability Factor:** 78.7%
Cumulative Energy Unavailability Factor: 21.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2007	4687,0	933	84,7	84,7	84,7	84,7	85,4	85,4	4955	84,3
2008	6116,2	933	71,0	76,5	71,0	76,5	74,6	79,0	6270	71,4
2009	6337,7	933	74,1	75,6	74,1	75,6	77,5	78,4	6553	74,8
2010	7539,6	933	87,0	78,7	87,0	78,7	92,2	82,2	7643	87,2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2007 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					78	
C. Inspection, maintenance or repair combined with refuelling	1117			975		
D. Inspection, maintenance or repair without refuelling				347		
Subtotal	1117	0	0	1322	78	0
Total		1117			1400	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2007 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		15
42. Electrical Power Supply Systems		63
Total	0	78

CN-11 TIANWAN 2

Operator: JNPC (Jiangsu Nuclear Power Corporation)
Contractor: IZ (Izhorskiye Zavody)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 933.0 MW(e)
Design Net Capacity: 933.0 MW(e)
Design Discharge Burnup: —
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7131.1 GW(e).h
Energy Availability Factor: 82.3%
Load Factor: 87.3%
Operating Factor: 82.9%
Energy Unavailability Factor: 17.7%
Total Off-line Time: 1500 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	740,7	654,7	738,4	550,0	446,0	0,0	671,8	732,8	712,9	729,6	717,1	437,2	7131,1
EAFF (%)	100,0	99,0	100,0	77,8	60,8	0,0	91,6	100,0	100,0	98,9	100,0	59,1	82,3
UCF (%)	100,0	99,0	100,0	77,9	60,8	0,0	91,6	100,0	100,0	98,9	100,0	59,1	82,3
LF (%)	106,7	104,4	106,4	81,9	64,2	0,0	96,8	105,6	106,1	105,1	106,8	63,0	87,3
OF (%)	100,0	100,0	100,0	79,3	61,4	0,0	93,1	100,0	100,0	100,0	100,0	60,6	82,9
EUFF (%)	0,0	1,0	0,0	22,2	39,2	100,0	8,4	0,0	0,0	1,1	0,0	40,9	17,7
PUFF (%)	0,0	0,0	0,0	22,2	39,2	100,0	8,4	0,0	0,0	1,1	0,0	40,9	17,6
UCLF (%)	0,0	1,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1
XUFL (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN 2010, UNIT 2 REMAINED IN POWER OPERATION WITHOUT AUTOMATIC AND MANUAL SCRAM EVENTS EXCEPT THAT 1 REFUELLING OUTAGE AND 2 PLANNED MAINTENANCES WERE CONDUCTED FOR TNPS UNIT 2. THE DETAILS ARE AS FOLLOWS: AT 03:30 ON 11 FEBRUARY, 3 ROTATING STRAINERS FAILED AND WERE SHUT DOWN TO THE INCREASE OF SEAWEED IN THE SEAWATER, THE RECIRCULATION WATER PUMPS PAC32AP001 AND PAC21AP001 WERE SHUT DOWN MANUALLY, AND THE POWER DECREASED TO 590MWE. AT 22:05, PAC21AP001 STARTED UP AFTER ELIMINATION OF DEFECTS OF 3 ROTATING STRAINERS, AND THE POWER BEGAN TO INCREASE. AT 12:00 ON 12 FEBRUARY, THE UNIT POWER WAS INCREASED TO FULL POWER. AT 05:00 ON APRIL 15, THE UNIT POWER BEGAN TO DECREASE. AT 14:00, THE UNIT WAS DISCONNECTED FROM THE GRID, AND THE FIRST PLANNED MAINTENANCE FOR YEAR 2010 STARTED TO PROCESS THE DEFECT OF HEAT RELEASE RATE OF RADIAL THRUST BEARING OF NO. 1 RCP. AT 19:17 ON APRIL 21, THE GENERATOR WAS CONNECTED TO THE GRID AND THE FIRST PLANNED MAINTENANCE FOR YEAR 2010 ENDED. AT 14:35 ON APRIL 22, THE REACTOR POWER WAS INCREASED TO FULL POWER. AT 15:09 ON MAY 19, THE UNIT POWER BEGAN TO DECREASE. AT 00:40 ON MAY 20, THE UNIT WAS SHUT DOWN, THE GENERATOR WAS DISCONNECTED FROM THE GRID, AND T203 REFUELLING OUTAGE STARTED. AT 02:52 ON JULY 3, THE TURBINE GENERATOR WAS CONNECTED TO THE GRID AND T203 REFUELLING OUTAGE ENDED. AT 12:17 ON JULY 5, THE REACTOR POWER WAS INCREASED TO FULL POWER. AT 05:25 ON 5 OCTOBER, THE UNIT POWER BEGAN TO DECREASE SO AS TO COMPLY WITH 500KV LINE SWITCH-OFF FOR THE DOUBLE MODIFICATION ON THE WIRING PROTECTION. AT 06:10, THE ELECTRICAL POWER OF UNIT DECREASED TO 930MWE. AT 18:00 ON 7 OCTOBER, THE UNIT POWER WAS INCREASED FROM 87%NNOM. AT 19:40, THE UNIT POWER WAS INCREASED TO 100%NNOM. AT 15:42 ON 8 DECEMBER, THE UNIT POWER BEGAN TO DECREASE. AT 00:12 ON 9 DECEMBER, THE UNIT WAS DISCONNECTED FROM THE GRID AND THE SECOND PLANNED MAINTENANCE FOR THIS YEAR STARTED TO PROCESS THE DEFECT OF HEAT RELEASE RATE OF NO. 3 AND 4 RCP RADIAL THRUST BEARING. AT 05:35 ON 21 DECEMBER, THE GENERATOR WAS CONNECTED TO THE GRID AND THE SECOND MAINTENANCE FOR YEAR 2010 ENDED. AT 02:56 ON 22 DECEMBER, THE REACTOR POWER WAS INCREASED TO 100%NNOM AND REMAINED IN STABLE OPERATION.

5. Historical Summary

Date of Construction Start: 20/10/2000 **Lifetime Generation:** 25051.0 GW(e).h
Date of First Criticality: 05 Jan 2007 **Cumulative Energy Availability Factor:** 83.7%
Date of Grid Connection: 14/05/2007 **Cumulative Load Factor:** 87.7%
Date of Commercial Operation: 16/08/2007 **Cumulative Unit Capability Factor:** 83.7%
Cumulative Energy Unavailability Factor: 16.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2007	3459,0	958	100,0	100,0	100,0	100,0	101,0	101,0	3586	97,7
2008	7003,0	933	81,2	86,7	81,2	86,7	85,4	90,0	7193	81,9
2009	6943,4	933	80,7	84,2	80,7	84,2	85,0	87,9	7054	80,5
2010	7131,1	933	82,3	83,7	82,3	83,7	87,3	87,7	7260	82,9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2008 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
C. Inspection, maintenance or repair combined with refuelling	1058			931		
D. Inspection, maintenance or repair without refuelling	442			166		
Subtotal	1500	0	0	1097	0	0
Total		1500			1097	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2008 to 2010 Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

TW-1 CHIN SHAN-1

Operator: TPC (TAI POWER CO.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUF)
 at the beginning of 2010: 604.0 MW(e)
 Design Net Capacity: 604.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4401.4 GW(e).h
 Energy Availability Factor: 83.2%
 Load Factor: 83.2%
 Operating Factor: 83.9%
 Energy Unavailability Factor: 16.8%
 Total Off-line Time: 1409 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	449.4	405.8	448.3	373.7	0.0	153.4	449.3	449.3	433.1	444.4	346.4	448.2	4401.4
EAF (%)	100.0	100.0	99.8	85.9	0.0	35.3	100.0	100.0	99.6	98.9	79.6	99.7	83.2
UCF (%)	100.0	100.0	99.8	85.9	0.0	35.3	100.0	100.0	99.6	98.9	79.7	99.8	83.2
LF (%)	100.0	100.0	99.8	85.9	0.0	35.3	100.0	100.0	99.6	98.9	79.6	99.7	83.2
OF (%)	100.0	100.0	100.0	87.6	0.0	39.2	100.0	100.0	100.0	100.0	80.8	100.0	83.9
EUF (%)	0.0	0.0	0.2	14.1	100.0	64.7	0.0	0.0	0.4	1.1	20.4	0.3	16.8
PUF (%)	0.0	0.0	0.2	14.1	100.0	4.7	0.0	0.0	0.4	1.1	20.4	0.3	11.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1.EOC-24 REFUELING OUTAGE SINCE APR.26,2010 TO JUN.01,2010. 2.OUTAGE EXTENSION TP REPAIR
 TURBINE BLADE SINCE JUN.01,2010 TO JUN.18,2010.

5. Historical Summary

Date of Construction Start: 06 Feb 1972 Lifetime Generation: 136400.7 GW(e).h
 Date of First Criticality: 16/10/1977 Cumulative Energy Availability Factor: 82.6%
 Date of Grid Connection: 16/11/1977 Cumulative Load Factor: 82.1%
 Date of Commercial Operation: 12 Oct 1978 Cumulative Unit Capability Factor: 83.6%
 Cumulative Energy Unavailability Factor: 17.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978			Data not provided							
1979			"							
1980			"							
1981			"							
1982			"							
1983			"							
1984			"							
1985			"							
1986			"							
1987			"							
1988			"							
1989	2783.4	604	55.3	55.3	55.3	55.3	52.6	52.6	5226	59.7
1990	2968.5	591	55.4	55.3	54.8	55.1	57.3	54.9	5315	60.7
1991	4391.4	604	83.9	64.9	82.0	64.1	83.0	64.4	7602	86.8
1992	4017.7	604	77.6	68.1	76.6	67.3	75.7	67.2	7260	82.7
1993	4424.0	604	86.5	71.8	83.0	70.4	83.6	70.5	7854	89.7
1994	3645.4	604	69.4	71.4	67.7	70.0	68.9	70.2	6458	73.7
1995	4154.3	604	81.0	72.8	80.5	71.5	78.5	71.4	7168	81.8
1996	4070.9	604	81.8	73.9	78.6	72.4	76.7	72.1	7051	80.3
1997	4990.5	604	96.4	76.4	96.2	75.0	94.3	74.6	8558	97.7
1998	4295.1	604	85.2	77.3	83.5	75.9	81.2	75.2	7448	85.0
1999	4081.1	604	81.2	77.7	78.8	76.1	77.1	75.4	7156	81.7
2000	5226.1	604	99.8	79.5	99.2	78.1	98.5	77.3	8784	100.0
2001	4319.7	604	82.1	79.7	81.5	78.3	81.6	77.7	7282	83.1
2002	4376.0	604	83.5	80.0	83.4	78.7	82.7	78.0	7367	84.1
2003	5240.0	604	99.6	81.3	99.4	80.1	99.0	79.4	8760	100.0
2004	4541.9	604	86.4	81.6	85.8	80.4	85.6	79.8	7646	87.0
2005	4573.8	604	87.9	82.0	86.8	80.8	86.4	80.2	7745	88.4
2006	5201.8	604	99.5	83.0	99.5	81.8	98.3	81.2	8760	100.0
2007	4607.9	604	88.8	83.3	88.2	82.2	87.1	81.5	7834	89.4
2008	3998.9	604	75.6	82.9	75.4	81.8	75.4	81.2	6822	77.7
2009	5173.7	604	97.9	83.6	97.8	82.6	97.8	82.0	8668	98.9
2010	4401.4	604	83.2	83.6	83.2	82.6	83.2	82.1	7351	83.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		424			174	
B. Refuelling without a maintenance				87		
C. Inspection, maintenance or repair combined with refuelling	840			909		
D. Inspection, maintenance or repair without refuelling	137			32		
E. Testing of plant systems or components	7			0	9	
H. Nuclear regulatory requirements						0
J. Grid limitation, failure or grid unavailability						6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						14
Subtotal	984	424	0	1028	183	20
Total		1408			1231	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		2
14. Safety Systems		51
15. Reactor Cooling Systems		38
31. Turbine and auxiliaries	424	30
32. Feedwater and Main Steam System		2
41. Main Generator Systems		13
42. Electrical Power Supply Systems		35
Total	424	171

TW-2 CHIN SHAN-2

Operator: TPC (TAI POWER CO.)

Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 604.0 MW(e)
 Design Net Capacity: 604.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5208.1 GW(e).h
 Energy Availability Factor: 98.4%
 Load Factor: 98.4%
 Operating Factor: 99.1%
 Energy Unavailability Factor: 1.6%
 Total Off-line Time: 77 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	446.4	405.8	439.0	428.5	449.4	379.7	449.4	449.4	428.2	449.4	434.9	448.3	5208.1
EAF (%)	99.3	100.0	97.7	98.5	100.0	87.3	100.0	100.0	98.5	100.0	100.0	99.8	98.4
UCF (%)	99.3	100.0	97.7	98.5	100.0	87.3	100.0	100.0	98.5	100.0	100.0	99.8	98.4
LF (%)	99.3	100.0	97.7	98.5	100.0	87.3	100.0	100.0	98.5	100.0	100.0	99.8	98.4
OF (%)	100.0	100.0	100.0	100.0	100.0	89.3	100.0	100.0	100.0	100.0	100.0	100.0	99.1
EUf (%)	0.7	0.0	2.3	1.5	0.0	12.7	0.0	0.0	1.5	0.0	0.0	0.2	1.6
PUF (%)	0.0	0.0	0.3	1.5	0.0	12.7	0.0	0.0	1.5	0.0	0.0	0.2	1.3
UCLF (%)	0.7	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1.REPAIR HEATER BAY DEVICES FOR LEAKING ON FEB.05,2010. 2.MAINTAIN AOV-B31-F019S AND V-103-291S FOR LEAKING ON MAR.13,2010. 3.UNIT SHUTDOWN FOR INSPECT LP TURBINE BLADE SINCE JUN.24,2010 TO JUN.28,2010. 4.ST-BS & 4.16KV BUS #2 EXCUTED LOADING TEST ON SEP.25,2010.

5. Historical Summary

Date of Construction Start: 12 Jul 1973 Lifetime Generation: 135426.0 GW(e).h
 Date of First Criticality: 11 Sep 1978 Cumulative Energy Availability Factor: 82.4%
 Date of Grid Connection: 19/12/1978 Cumulative Load Factor: 82.4%
 Date of Commercial Operation: 15/07/1979 Cumulative Unit Capability Factor: 83.4%
 Cumulative Energy Unavailability Factor: 17.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979			Data not provided							
1980			"							
1981			"							
1982			"							
1983			"							
1984			"							
1985			"							
1986			"							
1987			"							
1988			"							
1989	3059.8	604	59.3	59.3	59.3	59.3	57.8	57.8	6010	68.6
1990	3436.8	593	65.4	62.3	64.8	62.1	66.2	62.0	6242	71.3
1991	3783.5	604	72.5	65.8	70.1	64.8	71.5	65.2	6847	78.2
1992	4129.2	604	79.1	69.1	78.5	68.2	77.8	68.3	7326	83.4
1993	3934.9	604	76.7	70.6	73.1	69.2	74.4	69.6	6992	79.8
1994	3979.5	604	78.8	72.0	76.6	70.4	75.2	70.5	7001	79.9
1995	3885.7	604	77.5	72.8	75.9	71.2	73.4	70.9	6808	77.7
1996	4001.5	604	78.0	73.4	77.5	72.0	75.4	71.5	6897	78.5
1997	4325.5	604	80.6	74.2	80.1	72.9	81.8	72.6	7168	81.8
1998	4841.5	604	96.0	76.4	94.7	75.1	91.5	74.5	8422	96.1
1999	4296.3	604	82.6	77.0	80.7	75.6	81.2	75.1	7274	83.0
2000	4596.5	604	85.9	77.7	85.3	76.4	86.6	76.1	7584	86.3
2001	5018.1	604	95.0	79.0	93.9	77.8	94.8	77.5	8515	97.2
2002	4290.4	604	80.6	79.2	80.5	77.9	81.1	77.8	7414	84.6
2003	4574.5	604	86.5	79.6	86.0	78.5	86.5	78.4	7595	86.7
2004	5247.6	604	98.6	80.8	98.0	79.7	98.9	79.7	8704	99.1
2005	4530.5	604	86.3	81.2	85.2	80.0	85.6	80.0	7641	87.2
2006	4650.8	604	88.4	81.6	87.5	80.4	87.9	80.4	7812	89.2
2007	5218.8	604	99.6	82.5	98.3	81.4	98.6	81.4	8654	98.8
2008	4422.4	604	83.6	82.6	83.4	81.5	83.4	81.5	7375	84.0
2009	4492.1	604	85.0	82.7	84.9	81.6	84.9	81.7	7501	85.6
2010	5208.1	604	98.4	83.4	98.4	82.4	98.4	82.4	8683	99.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					212	
B. Refuelling without a maintenance				85	8	
C. Inspection, maintenance or repair combined with refuelling				917		
D. Inspection, maintenance or repair without refuelling	77			59		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements						1
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						4
Subtotal	77	0	0	1063	220	14
Total		77			1297	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		24
12. Reactor I&C Systems		1
14. Safety Systems		1
15. Reactor Cooling Systems		56
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries		42
32. Feedwater and Main Steam System		15
33. Circulating Water System		10
41. Main Generator Systems		42
42. Electrical Power Supply Systems		10
Total	0	208

TW-3 KUOSHENG-1

Operator: TPC (TAI POWER CO.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 985.0 MW(e)
 Design Net Capacity: 985.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7949.6 GW(e).h
 Energy Availability Factor: 91.9%
 Load Factor: 92.1%
 Operating Factor: 93.0%
 Energy Unavailability Factor: 8.1%
 Total Off-line Time: 610 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	737.3	665.8	726.1	712.6	732.2	697.5	725.6	721.7	695.4	135.2	665.0	735.3	7949.6
EAF (%)	100.0	100.0	98.8	100.0	99.9	98.4	99.0	98.5	98.1	18.4	93.6	99.9	91.9
UCF (%)	100.0	100.0	99.1	100.0	100.0	99.2	99.9	99.9	99.8	19.2	93.7	99.9	92.4
LF (%)	100.6	100.6	99.1	100.5	99.9	98.4	99.0	98.5	98.1	18.4	93.8	100.3	92.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	20.7	97.2	100.0	93.0
EUf (%)	0.0	0.0	1.2	0.0	0.1	1.6	1.0	1.5	1.9	81.6	6.4	0.1	8.1
PUF (%)	0.0	0.0	0.9	0.0	0.0	0.8	0.1	0.2	0.2	80.8	6.3	0.0	7.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
XUF (%)	0.0	0.0	0.3	0.0	0.1	0.8	0.9	1.4	1.7	0.7	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

KUOSHENG #1 UNIT KEPT OPERATING ALL YEAR ROUND EXCEPT THE EOC-21 REFUELING OUTAGE DURING OCT.07 AND OCT.31.

5. Historical Summary

Date of Construction Start: 19/11/1975
 Date of First Criticality: 02 Jan 1981
 Date of Grid Connection: 21/05/1981
 Date of Commercial Operation: 28/12/1981
 Lifetime Generation: 192753.3 GW(e).h
 Cumulative Energy Availability Factor: 83.1%
 Cumulative Load Factor: 82.0%
 Cumulative Unit Capability Factor: 83.8%
 Cumulative Energy Unavailability Factor: 16.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1981	Data not provided										
1982	"										
1983	"										
1984	"										
1985	"										
1986	"										
1987	"										
1988	"										
1989	5329.1	951	64.9	64.9	63.0	63.0	64.0	64.0	6447	73.6	
1990	6898.0	918	87.4	76.0	86.8	74.7	85.8	74.7	8201	93.6	
1991	5850.8	951	71.4	74.4	71.4	73.6	70.2	73.2	6678	76.2	
1992	6152.4	951	78.4	75.4	78.4	74.8	73.6	73.3	7126	81.1	
1993	5679.5	951	71.1	74.6	71.1	74.0	68.2	72.3	6457	73.7	
1994	6302.3	950	77.8	75.1	76.9	74.5	75.7	72.8	7077	80.8	
1995	6897.9	948	84.7	76.5	84.6	76.0	83.1	74.3	7734	88.3	
1996	6950.8	948	84.8	77.5	84.3	77.0	83.5	75.5	7573	86.2	
1997	6277.8	948	77.7	77.5	77.5	77.1	75.6	75.5	6978	79.7	
1998	6426.0	948	81.2	77.9	79.7	77.3	77.4	75.7	7209	82.3	
1999	7686.8	948	95.1	79.5	93.8	78.8	92.6	77.2	8439	96.3	
2000	6588.6	948	81.3	79.6	80.2	78.9	79.1	77.4	7391	84.1	
2001	6452.3	948	79.4	79.6	78.8	78.9	77.7	77.4	7070	80.7	
2002	8068.5	948	98.5	81.0	98.1	80.3	97.2	78.8	8693	99.2	
2003	6444.9	948	78.5	80.8	78.3	80.2	77.6	78.7	6968	79.5	
2004	6978.5	948	85.1	81.1	84.7	80.5	83.8	79.0	7516	85.6	
2005	8150.1	948	99.7	82.2	98.4	81.5	98.1	80.2	8749	99.9	
2006	6903.6	948	82.6	82.2	81.9	81.5	81.0	80.2	7325	83.6	
2007	7104.6	985	83.5	82.3	82.3	81.6	82.3	80.3	7429	84.8	
2008	8384.8	985	98.0	83.1	96.9	82.4	96.9	81.2	8673	98.7	
2009	7558.4	985	88.3	83.3	87.5	82.6	87.6	81.5	7823	89.3	
2010	7949.6	985	92.4	83.8	91.9	83.1	92.1	82.0	8150	93.0	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				5	132	
B. Refuelling without a maintenance				78	11	
C. Inspection, maintenance or repair combined with refuelling	610			891		
D. Inspection, maintenance or repair without refuelling				73		
E. Testing of plant systems or components				9		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						5
L. Human factor related					3	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Subtotal	610	0	0	1056	146	7
Total		610			1209	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		3
15. Reactor Cooling Systems		5
21. Fuel Handling and Storage Facilities		18
31. Turbine and auxiliaries		26
32. Feedwater and Main Steam System		37
33. Circulating Water System		10
35. All other I&C Systems		2
41. Main Generator Systems		15
42. Electrical Power Supply Systems		9
Total	0	134

TW-4 KUOSHENG-2

Operator: TPC (TAI POWER CO.)

Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP at the beginning of 2010): 948.0 MW(e)
 Design Net Capacity: 951.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6997.8 GW(e).h
 Energy Availability Factor: 84.3%
 Load Factor: 84.3%
 Operating Factor: 87.3%
 Energy Unavailability Factor: 15.7%
 Total Off-line Time: 1111 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	502.1	625.8	465.9	69.5	696.2	581.5	683.6	690.2	649.8	666.5	674.0	692.8	6997.8
EAF (%)	71.2	98.2	66.1	10.2	98.7	85.2	96.9	97.9	95.2	94.5	98.7	98.2	84.3
UCF (%)	71.6	99.7	66.4	16.2	99.8	86.0	99.2	99.9	97.3	99.4	100.0	99.9	86.3
LF (%)	71.2	98.2	66.1	10.2	98.7	85.2	96.9	97.9	95.2	94.5	98.7	98.2	84.3
OF (%)	74.5	100.0	67.9	17.4	100.0	88.8	100.0	100.0	99.2	100.0	100.0	100.0	87.3
EUF (%)	28.8	1.8	33.9	89.8	1.3	14.8	3.1	2.1	4.8	5.5	1.3	1.8	15.7
PUF (%)	0.1	0.3	33.6	82.7	0.2	14.0	0.8	0.0	2.7	0.6	0.0	0.1	11.2
UCLF (%)	28.3	0.0	0.0	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	2.5
XUF (%)	0.4	1.4	0.3	6.0	1.1	0.8	2.2	2.0	2.1	4.9	1.2	1.7	2.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WERE SEVERAL FULL OUTAGES THIS YEAR. LISTED AS FOLLOW: JAN.1~11 MAINTENANCE OF RECIRC.B MOTOR MAR.22~APR.21 EOC-20 REFUELING OUTAGE AND TB O/S TRIP TEST JUN.11~15 MAINTENANCE OF MECH. SEAL OF RECIRC. PUMP.SEP.11 WEIGHTING OF BEARING OF GENERATOR (#9)

5. Historical Summary

Date of Construction Start: 15/03/1976 Lifetime Generation: 186176.0 GW(e).h
 Date of First Criticality: 26/03/1982 Cumulative Energy Availability Factor: 82.5%
 Date of Grid Connection: 29/06/1982 Cumulative Load Factor: 81.6%
 Date of Commercial Operation: 16/03/1983 Cumulative Unit Capability Factor: 83.8%
 Cumulative Energy Unavailability Factor: 17.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983			Data not provided							
1984			"							
1985			"							
1986			"							
1987			"							
1988			"							
1989	5227.3	951	65.3	65.3	61.9	61.9	62.7	62.7	6390	72.9
1990	6000.6	936	74.0	69.6	73.5	67.6	73.2	67.9	6819	77.8
1991	7186.3	951	89.3	76.2	89.3	74.9	86.3	74.1	8101	92.5
1992	6176.3	951	76.8	76.4	76.8	75.4	73.9	74.0	6985	79.5
1993	6138.1	951	74.9	76.1	74.9	75.3	73.7	74.0	6921	79.0
1994	6224.1	950	76.0	76.1	74.8	75.2	74.8	74.1	6868	78.4
1995	5999.7	948	72.9	75.6	72.2	74.8	72.2	73.8	6543	74.7
1996	7423.2	948	90.0	77.4	89.6	76.6	89.1	75.8	7978	90.8
1997	7087.2	948	88.7	78.7	86.1	77.7	85.3	76.8	7745	88.4
1998	6549.6	948	80.3	78.8	79.3	77.8	78.9	77.0	7242	82.7
1999	6831.9	948	85.9	79.5	84.2	78.4	82.3	77.5	7544	86.1
2000	7237.6	948	91.4	80.5	89.3	79.3	86.9	78.3	8234	93.7
2001	5976.7	948	74.1	80.0	72.4	78.8	72.0	77.8	6772	77.3
2002	6922.6	948	85.5	80.4	85.1	79.2	83.4	78.2	7530	86.0
2003	7623.1	948	93.7	81.3	93.5	80.2	91.8	79.1	8427	96.2
2004	6494.0	948	81.3	81.3	79.8	80.2	78.0	79.0	7301	83.1
2005	6737.8	948	83.5	81.4	82.3	80.3	81.1	79.2	7424	84.7
2006	7868.4	948	96.6	82.2	95.9	81.2	94.7	80.0	8560	97.7
2007	7031.5	948	86.7	82.5	86.1	81.4	84.7	80.3	7716	88.1
2008	7305.0	948	89.9	82.9	87.7	81.7	87.7	80.6	8029	91.4
2009	8068.1	948	99.2	83.6	97.2	82.5	97.2	81.4	8739	99.8
2010	6997.8	948	86.3	83.8	84.3	82.5	84.3	81.6	7649	87.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		198			116	
B. Refuelling without a maintenance				50	14	
C. Inspection, maintenance or repair combined with refuelling	824			870		
D. Inspection, maintenance or repair without refuelling	89			94		
E. Testing of plant systems or components				18		
J. Grid limitation, failure or grid unavailability					5	3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	12
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	913	198	0	1032	136	17
Total		1111			1185	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	198	0
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		1
14. Safety Systems		5
15. Reactor Cooling Systems		19
21. Fuel Handling and Storage Facilities		29
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System		19
33. Circulating Water System		4
35. All other I&C Systems		8
41. Main Generator Systems		3
42. Electrical Power Supply Systems		4
Total	198	109

TW-5 MAANSHAN-1

Operator: TPC (TAI POWER CO.)

Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 919.0 MW(e)
 Design Net Capacity: 890.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7272.4 GW(e).h
 Energy Availability Factor: 90.7%
 Load Factor: 90.3%
 Operating Factor: 91.4%
 Energy Unavailability Factor: 9.3%
 Total Off-line Time: 751 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	685.1	618.3	682.8	660.3	680.1	656.8	677.7	676.0	656.4	678.7	325.4	274.8	7272.4
EAF (%)	99.9	100.0	100.0	100.0	100.0	99.9	100.0	99.9	99.9	99.9	49.4	40.4	90.7
UCF (%)	99.9	100.0	100.0	100.0	100.0	99.9	100.0	99.9	99.9	99.9	49.4	40.4	90.7
LF (%)	100.2	100.1	99.9	99.8	99.5	99.3	99.1	98.9	99.2	99.3	49.2	40.2	90.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	50.3	47.2	91.4
EUUF (%)	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	50.6	59.6	9.3
PUF (%)	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	50.6	54.6	8.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	5.0	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

1. MAANSHAN UNIT 1 OPERATED AT FULL POWER IN BASE-LOAD OVER THE YEAR EXCEPT REFUELING OUTAGE, SURVEILLANCE TEST AND SO ON.

5. Historical Summary

Date of Construction Start: 21/08/1978 Lifetime Generation: 164277.1 GW(e).h
 Date of First Criticality: 30/03/1984 Cumulative Energy Availability Factor: 84.3%
 Date of Grid Connection: 05 Sep 1984 Cumulative Load Factor: 85.5%
 Date of Commercial Operation: 27/07/1984 Cumulative Unit Capability Factor: 85.7%
 Cumulative Energy Unavailability Factor: 15.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984			Data not provided							
1985			"							
1986			"							
1987			"							
1988			"							
1989	5418.4	890	66.3	66.3	66.0	66.0	69.5	69.5	6305	72.0
1990	6098.9	894	77.8	72.0	76.8	71.4	77.9	73.7	7079	80.8
1991	6479.1	890	84.0	76.0	82.7	75.2	83.1	76.8	7368	84.1
1992	6038.8	890	76.7	76.2	76.2	75.4	77.2	76.9	6826	77.7
1993	6258.8	890	78.5	76.7	78.5	76.0	80.3	77.6	6930	79.1
1994	6322.6	890	79.7	77.2	79.6	76.6	81.1	78.2	7098	81.0
1995	6741.1	890	84.5	78.2	84.4	77.7	86.5	79.4	7495	85.6
1996	7537.0	890	95.8	80.4	93.8	79.7	96.4	81.5	8329	94.8
1997	5949.2	890	74.8	79.8	74.3	79.1	76.3	80.9	6752	77.1
1998	5514.5	890	69.2	78.7	69.2	78.1	70.7	79.9	6101	69.6
1999	7392.7	890	96.3	80.3	92.6	79.5	94.8	81.3	8328	95.1
2000	6729.0	890	84.6	80.7	84.3	79.9	86.1	81.7	7502	85.4
2001	5333.3	890	86.1	81.1	67.6	78.9	68.4	80.6	6046	69.0
2002	7800.8	890	98.8	82.4	98.7	80.3	100.1	82.0	8726	99.6
2003	6751.0	890	87.3	82.7	86.2	80.7	86.6	82.3	7579	86.5
2004	6793.7	890	87.4	83.0	86.8	81.1	86.9	82.6	7742	88.1
2005	7701.7	890	98.1	83.9	98.0	82.1	98.8	83.6	8693	99.2
2006	6763.2	890	85.8	84.0	85.8	82.3	86.7	83.7	7599	86.7
2007	7168.2	890	90.9	84.3	90.8	82.7	91.9	84.2	8001	91.3
2008	7904.9	900	100.0	85.1	100.0	83.6	100.0	85.0	8784	100.0
2009	7205.2	918	90.5	85.4	90.3	83.9	90.3	85.2	7959	90.9
2010	7272.4	919	90.7	85.7	90.7	84.3	90.3	85.5	8009	91.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		30			178	
B. Refuelling without a maintenance				34	6	
C. Inspection, maintenance or repair combined with refuelling	711			822	82	
D. Inspection, maintenance or repair without refuelling				6	0	
E. Testing of plant systems or components	11			7		
H. Nuclear regulatory requirements					0	
J. Grid limitation, failure or grid unavailability						75
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						8
L. Human factor related					2	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
Subtotal	722	30	0	869	268	86
Total		752			1223	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		11
13. Reactor Auxiliary Systems		1
15. Reactor Cooling Systems		21
16. Steam generation systems	30	16
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		7
41. Main Generator Systems		71
42. Electrical Power Supply Systems		33
Total	30	176

TW-6 MAANSHAN-2

Operator: TPC (TAI POWER CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 922.0 MW(e)
Design Net Capacity: 890.0 MW(e)
Design Discharge Burnup: 43000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8056.9 GW(e).h
Energy Availability Factor: 99.8%
Load Factor: 99.8%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.2%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	690.2	622.4	687.9	665.4	685.7	662.3	682.7	670.4	660.1	679.7	663.2	686.9	8056.9
EAF (%)	100.0	100.0	99.9	100.0	100.0	100.0	100.0	98.6	100.0	99.5	100.0	100.0	99.8
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6	100.0	99.5	100.0	100.0	99.8
LF (%)	100.6	100.4	100.3	100.2	100.0	99.8	99.5	97.7	99.4	99.1	99.9	100.1	99.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.4	0.0	0.5	0.0	0.0	0.2
PUf (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 21/02/1979 **Lifetime Generation:** 168272.4 GW(e).h
Date of First Criticality: 02 Jan 1985 **Cumulative Energy Availability Factor:** 85.1%
Date of Grid Connection: 25/02/1985 **Cumulative Load Factor:** 86.7%
Date of Commercial Operation: 18/05/1985 **Cumulative Unit Capability Factor:** 86.8%
Cumulative Energy Unavailability Factor: 14.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1985	Data not provided										
1986	"										
1987	"										
1988	"										
1989	5283.3	890	58.8	58.8	58.1	58.1	67.8	67.8	6434	73.4	
1990	6141.3	896	78.8	68.9	77.3	67.7	78.2	73.0	7143	81.5	
1991	6187.1	890	80.4	72.7	78.6	71.3	79.4	75.1	7155	81.7	
1992	5956.6	890	84.3	75.6	75.5	72.4	76.2	75.4	7541	85.8	
1993	6551.0	890	84.1	77.3	84.1	74.7	84.0	77.1	7442	85.0	
1994	7006.5	890	93.3	80.0	88.7	77.0	89.9	79.2	8216	93.8	
1995	6118.6	890	77.1	79.6	77.1	77.1	78.5	79.1	6947	79.3	
1996	6349.8	890	81.0	79.7	79.8	77.4	81.2	79.4	7091	80.7	
1997	6415.4	890	81.6	79.9	81.1	77.8	82.3	79.7	7153	81.7	
1998	7781.1	890	97.4	81.7	97.2	79.7	99.8	81.7	8557	97.7	
1999	6628.4	890	85.3	82.0	82.7	80.0	85.0	82.0	7427	84.8	
2000	6618.6	890	84.1	82.2	82.6	80.2	84.7	82.2	7401	84.3	
2001	6993.8	890	99.4	83.5	87.3	80.8	89.7	82.8	7729	88.2	
2002	6639.8	890	82.4	83.4	82.4	80.9	85.2	83.0	7507	85.7	
2003	6737.6	890	86.6	83.6	85.2	81.2	86.4	83.2	7549	86.2	
2004	7883.0	890	99.5	84.6	99.5	82.3	100.8	84.3	8784	100.0	
2005	6710.0	890	85.5	84.7	85.1	82.5	86.1	84.4	7656	87.4	
2006	6928.8	890	87.7	84.8	87.2	82.8	88.9	84.7	7729	88.2	
2007	7829.9	890	98.3	85.6	98.3	83.6	100.4	85.5	8631	98.5	
2008	7280.0	908	91.3	85.8	91.3	84.0	91.3	85.8	8036	91.5	
2009	7389.2	921	91.8	86.1	91.6	84.3	91.6	86.1	8074	92.2	
2010	8056.9	922	99.8	86.8	99.8	85.1	99.8	86.7	8760	100.0	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					130	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				894	3	
D. Inspection, maintenance or repair without refuelling				12		
E. Testing of plant systems or components				1		
J. Grid limitation, failure or grid unavailability						46
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	2
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
Subtotal	0	0	0	907	134	54
Total		0			1095	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems		33
16. Steam generation systems		2
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		6
35. All other I&C Systems		5
41. Main Generator Systems		36
42. Electrical Power Supply Systems		5
Total	0	127

CZ-4 DUKOVANY-1**Operator:** CEZ (CZECH POWER COMPANY , CEZ a.s.)**Contractor:** SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)**1. Station Details**

Type:	PWR
Net Reference Unit Power (RUP at the beginning of 2010):	427.0 MW(e)
Design Net Capacity:	420.0 MW(e)
Design Discharge Burnup:	44000 MW.d/t
Status at end of year:	Operational

2. Production Summary 2010

Net Energy Production:	3573.8 GW(e).h
Energy Availability Factor:	93.8%
Load Factor:	95.5%
Operating Factor:	94.2%
Energy Unavailability Factor:	6.2%
Total Off-line Time:	504 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	327,0	295,7	326,2	315,0	320,8	307,7	315,1	315,9	105,5	301,7	315,7	327,7	3573,8
EAF (%)	100,0	100,0	100,0	100,0	99,9	99,6	99,1	99,3	34,3	92,3	100,0	100,0	93,8
UCF (%)	100,0	100,0	100,0	100,0	99,9	100,0	100,0	100,0	34,8	92,3	100,0	100,0	94,0
LF (%)	102,9	103,0	102,8	102,5	101,0	100,1	99,2	99,4	34,3	94,8	102,7	103,1	95,5
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	35,3	94,9	100,0	100,0	94,2
EUf (%)	0,0	0,0	0,0	0,0	0,1	0,4	0,9	0,7	65,7	7,7	0,0	0,0	6,2
PUf (%)	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	65,2	7,0	0,0	0,0	6,0
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,0	0,0	0,1
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,4	0,9	0,7	0,5	0,0	0,0	0,0	0,2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start:	01 Jän 1979	Lifetime Generation:	78518.8 GW(e).h
Date of First Criticality:	02 Dez 1985	Cumulative Energy Availability Factor:	83.6%
Date of Grid Connection:	24/02/1985	Cumulative Load Factor:	84.6%
Date of Commercial Operation:	05 Mär 1985	Cumulative Unit Capability Factor:	84.4%
		Cumulative Energy Unavailability Factor:	16.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	1993,9	396	88,1	88,1	88,1	88,1	86,7	86,7	5178	88,1
1986	2658,4	403	76,1	80,9	76,1	80,8	75,3	79,8	7094	81,0
1987	2575,9	408	74,7	78,5	70,7	77,0	72,1	76,9	6867	78,4
1988	2524,0	408	74,2	77,3	71,5	75,5	70,4	75,1	6996	79,6
1989	2940,6	408	82,6	78,5	82,0	76,9	82,3	76,6	7579	86,5
1990	2965,6	408	84,3	79,5	82,5	77,9	83,0	77,8	7658	87,4
1991	2581,1	408	70,7	78,2	70,5	76,8	72,2	76,9	6751	77,1
1992	3172,8	408	80,9	78,5	80,5	77,3	88,5	78,5	7537	85,8
1993	3239,7	442	83,7	79,2	83,7	78,1	83,7	79,1	7649	87,3
1994	3278,5	442	84,6	79,8	84,6	78,8	84,7	79,7	7656	87,4
1995	2966,1	442	76,8	79,5	76,8	78,6	76,6	79,4	7022	80,2
1996	3144,6	412	86,0	80,0	85,4	79,2	86,9	80,0	7592	86,4
1997	3295,6	440	86,8	80,6	85,3	79,7	85,5	80,5	7678	87,6
1998	2973,4	412	85,4	80,9	82,6	79,9	82,4	80,6	7518	85,8
1999	2901,1	412	79,8	80,9	79,2	79,8	80,4	80,6	7034	80,3
2000	3327,9	412	89,8	81,4	89,7	80,5	92,0	81,3	7934	90,3
2001	3328,9	412	90,6	82,0	90,2	81,0	92,2	82,0	7996	91,3
2002	3267,5	412	89,6	82,4	88,9	81,5	90,5	82,5	7926	90,5
2003	3032,0	412	82,9	82,4	82,6	81,5	84,0	82,5	7261	82,9
2004	3035,5	412	83,6	82,5	82,9	81,6	83,9	82,6	7349	83,7
2005	3324,5	412	91,3	82,9	90,6	82,0	92,1	83,1	8015	91,5
2006	3271,6	412	91,2	83,3	89,7	82,4	90,6	83,4	8014	91,5
2007	2967,3	427	81,4	83,2	80,9	82,3	81,7	83,3	7198	82,2
2008	3485,3	427	91,8	83,6	91,6	82,7	92,9	83,8	8090	92,1
2009	3518,6	427	92,7	84,0	92,5	83,1	94,1	84,2	8186	93,4
2010	3573,8	427	94,0	84,4	93,8	83,6	95,5	84,6	8256	94,2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		5			59	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	499			1057		
D. Inspection, maintenance or repair without refuelling				104		
J. Grid limitation, failure or grid unavailability						4
L. Human factor related					0	
Subtotal	499	5	0	1161	59	4
Total		504			1224	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		4
14. Safety Systems		8
15. Reactor Cooling Systems		18
16. Steam generation systems		4
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System	5	
41. Main Generator Systems		0
42. Electrical Power Supply Systems		18
Total	5	55

CZ-5 DUKOVANY-2

Operator: CEZ (CZECH POWER COMPANY, CEZ a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 427.0 MW(e)
 Design Net Capacity: 420.0 MW(e)
 Design Discharge Burnup: 44000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3535.9 GW(e).h
 Energy Availability Factor: 93.4%
 Load Factor: 94.5%
 Operating Factor: 94.2%
 Energy Unavailability Factor: 6.6%
 Total Off-line Time: 510 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	324,4	293,5	323,3	172,6	228,5	306,1	309,7	312,7	309,6	322,7	310,0	322,8	3535,9
EAF (%)	100,0	100,0	100,0	55,0	70,9	99,2	97,6	98,4	99,8	100,0	99,9	100,0	93,4
UCF (%)	100,0	100,0	100,0	55,0	70,9	100,0	100,0	100,0	99,8	100,0	99,9	100,0	93,8
LF (%)	102,1	102,3	101,9	56,2	71,9	99,6	97,5	98,4	100,7	101,4	100,8	101,6	94,5
OF (%)	100,0	100,0	100,0	55,8	74,2	100,0	100,0	100,0	100,0	100,0	100,0	100,0	94,2
EUF (%)	0,0	0,0	0,0	45,0	29,1	0,8	2,4	1,6	0,2	0,0	0,1	0,0	6,6
PUF (%)	0,0	0,0	0,0	45,0	28,4	0,0	0,0	0,0	0,2	0,0	0,1	0,0	6,1
UCLF (%)	0,0	0,0	0,0	0,0	0,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1
XUF (%)	0,0	0,0	0,0	0,0	0,1	0,8	2,4	1,6	0,0	0,0	0,0	0,0	0,4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 01 Jan 1979 Lifetime Generation: 76377.9 GW(e).h
 Date of First Criticality: 23/01/1986 Cumulative Energy Availability Factor: 84.0%
 Date of Grid Connection: 30/01/1986 Cumulative Load Factor: 85.1%
 Date of Commercial Operation: 21/03/1986 Cumulative Unit Capability Factor: 84.8%
 Cumulative Energy Unavailability Factor: 16.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	2693,7	408	94,4	94,4	94,4	94,4	89,9	89,9	6906	94,0
1987	2668,6	408	76,6	84,7	71,6	82,0	74,7	81,6	6997	79,9
1988	2771,3	408	74,9	81,2	74,6	79,4	77,3	80,1	6963	79,3
1989	3011,0	408	82,7	81,6	82,2	80,1	84,2	81,2	7713	88,0
1990	2822,7	408	80,1	81,3	76,5	79,4	79,0	80,7	7566	86,4
1991	2901,4	408	81,6	81,3	81,2	79,7	81,2	80,8	7600	86,8
1992	2830,6	408	71,6	79,9	71,4	78,5	79,0	80,5	6551	74,6
1993	3256,9	440	84,2	80,5	84,2	79,2	84,5	81,1	7496	85,6
1994	3094,3	440	80,8	80,5	79,6	79,3	80,3	81,0	7315	83,5
1995	3263,3	440	85,5	81,1	84,3	79,8	84,7	81,4	7720	88,1
1996	2831,0	412	78,3	80,8	77,3	79,6	78,2	81,1	6917	78,7
1997	3144,8	440	81,1	80,8	81,1	79,7	81,6	81,1	7179	82,0
1998	3209,2	412	88,2	81,4	87,7	80,3	88,9	81,7	7803	89,1
1999	3198,1	412	88,4	81,9	87,8	80,9	88,6	82,2	7812	89,2
2000	2954,1	412	81,8	81,9	81,2	80,9	81,6	82,2	7223	82,2
2001	3121,1	412	86,9	82,2	86,4	81,2	86,5	82,4	7646	87,3
2002	3159,6	412	88,3	82,6	87,8	81,6	87,5	82,7	7716	88,1
2003	3252,6	412	89,8	83,0	89,2	82,0	90,1	83,2	7939	90,6
2004	3087,7	412	84,4	83,0	84,2	82,2	85,3	83,3	7439	84,7
2005	3313,2	412	91,3	83,5	90,8	82,6	91,8	83,7	8048	91,9
2006	3294,7	412	91,1	83,8	90,6	83,0	91,3	84,1	8017	91,5
2007	3274,7	412	90,9	84,1	90,1	83,3	90,7	84,4	7983	91,1
2008	3040,4	427	82,1	84,0	81,6	83,2	82,0	84,3	7228	82,3
2009	3507,9	427	93,2	84,4	92,8	83,6	93,8	84,7	8209	93,7
2010	3535,9	427	93,8	84,8	93,4	84,0	94,5	85,1	8250	94,2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		4			40	
B. Refuelling without a maintenance					10	
C. Inspection, maintenance or repair combined with refuelling	505			1055		
D. Inspection, maintenance or repair without refuelling				73		
J. Grid limitation, failure or grid unavailability					1	3
L. Human factor related					0	
Subtotal	505	4	0	1128	51	3
Total		509			1182	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		7
15. Reactor Cooling Systems	4	4
16. Steam generation systems		5
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		15
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems		0
Total	4	35

CZ-8 DUKOVANY-3

Operator: CEZ (CZECH POWER COMPANY, CEZ a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 471.0 MW(e)
Design Net Capacity: 420.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3283.5 GW(e).h
Energy Availability Factor: 80.0%
Load Factor: 79.6%
Operating Factor: 81.6%
Energy Unavailability Factor: 20.0%
Total Off-line Time: 1614 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	286,6	295,2	0,0	254,7	345,3	328,3	336,0	340,5	333,4	349,2	77,5	337,0	3283,5
EAF (%)	81,9	93,6	0,0	74,7	99,0	97,8	96,6	97,9	98,8	99,7	23,5	96,7	80,0
UCF (%)	82,0	94,9	0,0	75,1	99,8	99,7	99,3	100,0	100,0	100,0	23,6	97,3	80,9
LF (%)	81,8	93,3	0,0	75,1	98,5	96,8	95,9	97,2	98,3	99,5	22,8	96,2	79,6
OF (%)	83,3	95,2	0,0	78,6	100,0	100,0	100,0	100,0	100,0	100,0	23,6	98,5	81,6
EUAF (%)	18,1	6,4	100,0	25,3	1,0	2,2	3,4	2,1	1,2	0,3	76,5	3,3	20,0
PUF (%)	0,0	5,1	100,0	8,4	0,0	0,0	0,0	0,0	0,0	0,0	76,4	2,7	16,1
UCLF (%)	18,0	0,0	0,0	16,5	0,3	0,3	0,7	0,0	0,0	0,0	0,0	0,0	3,0
XUF (%)	0,1	1,3	0,0	0,4	0,7	1,9	2,7	2,1	1,2	0,2	0,1	0,6	0,9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 03 Jan 1979 **Lifetime Generation:** 73926.0 GW(e).h
Date of First Criticality: 28/10/1986 **Cumulative Energy Availability Factor:** 82.4%
Date of Grid Connection: 14/11/1986 **Cumulative Load Factor:** 83.7%
Date of Commercial Operation: 20/12/1986 **Cumulative Unit Capability Factor:** 84.1%
Cumulative Energy Unavailability Factor: 17.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	253,0	408	100,0	100,0	100,0	100,0	87,6	87,6	744	100,0
1987	3109,9	408	86,4	87,4	84,3	85,5	87,0	87,1	7644	87,3
1988	2988,9	408	81,4	84,5	80,0	82,8	83,4	85,3	7672	87,3
1989	2685,7	408	71,4	80,3	71,0	79,0	75,1	82,0	6678	76,2
1990	2982,0	408	85,0	81,4	80,3	79,3	83,4	82,4	7763	88,6
1991	2987,0	408	81,6	81,4	81,3	79,7	83,6	82,6	7784	88,9
1992	2917,9	408	72,6	80,0	72,3	78,5	81,4	82,4	6678	76,0
1993	3190,5	452	80,5	80,1	80,5	78,8	80,6	82,1	7259	82,9
1994	3343,9	452	84,5	80,7	84,5	79,6	84,5	82,4	7870	89,8
1995	2689,6	452	87,4	81,4	70,0	78,4	67,9	80,7	7788	88,9
1996	2871,2	412	80,4	81,3	78,3	78,4	79,3	80,6	7114	81,0
1997	2904,6	440	75,5	80,8	74,9	78,1	75,4	80,1	6774	77,3
1998	3090,1	412	85,7	81,2	85,0	78,6	85,6	80,5	7564	86,3
1999	3246,2	412	89,9	81,8	89,3	79,4	89,9	81,2	7849	89,6
2000	3187,9	412	88,7	82,3	87,4	80,0	88,1	81,7	7776	88,5
2001	3006,0	412	83,8	82,4	82,7	80,2	83,3	81,8	7309	83,4
2002	3259,4	412	89,9	82,9	89,6	80,7	90,3	82,3	7880	90,0
2003	3280,1	412	90,5	83,3	89,8	81,3	90,9	82,8	7934	90,6
2004	3302,5	412	90,3	83,7	90,2	81,7	91,2	83,3	7957	90,6
2005	2964,9	427	80,0	83,5	79,6	81,6	80,2	83,1	7034	80,3
2006	3396,2	427	90,8	83,9	90,0	82,1	90,8	83,5	8004	91,4
2007	3427,9	427	91,4	84,2	90,9	82,5	91,6	83,9	8068	92,1
2008	3548,8	427	93,7	84,7	93,2	83,0	94,6	84,4	8273	94,2
2009	2944,7	471	74,8	84,2	74,1	82,6	73,6	83,9	6688	76,3
2010	3283,5	471	80,9	84,1	80,0	82,4	79,6	83,7	7146	81,6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		243			79	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	810			1079		
D. Inspection, maintenance or repair without refuelling	561			27		
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Subtotal	1371	243	0	1106	90	3
Total		1614			1199	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems	119	2
15. Reactor Cooling Systems		31
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System	124	2
35. All other I&C Systems		0
41. Main Generator Systems		33
42. Electrical Power Supply Systems		3
Total	243	75

CZ-9 DUKOVANY-4

Operator: CEZ (CZECH POWER COMPANY, CEZ a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 427.0 MW(e)
 Design Net Capacity: 420.0 MW(e)
 Design Discharge Burnup: 44000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2895.1 GW(e).h
 Energy Availability Factor: 76.7%
 Load Factor: 77.4%
 Operating Factor: 78.2%
 Energy Unavailability Factor: 23.3%
 Total Off-line Time: 1914 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	315,7	293,7	322,0	311,4	320,2	305,7	313,1	312,7	306,2	79,4	0,0	15,0	2895,1
EAF (%)	97,4	100,0	99,9	99,8	99,9	99,4	98,5	98,7	99,0	25,6	0,0	4,8	76,7
UCF (%)	97,4	100,0	99,9	99,8	100,0	100,0	100,0	99,8	100,0	28,1	0,0	4,8	77,3
LF (%)	99,4	102,3	101,5	101,3	100,8	99,4	98,6	98,4	99,6	25,0	0,0	4,7	77,4
OF (%)	98,3	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	28,1	0,0	13,3	78,2
EUF (%)	2,6	0,0	0,1	0,2	0,1	0,6	1,5	1,3	1,0	74,4	100,0	95,2	23,3
PUF (%)	0,0	0,0	0,1	0,2	0,0	0,0	0,0	0,0	0,0	71,9	100,0	95,2	22,4
UCLF (%)	2,6	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,0	0,0	0,0	0,0	0,2
XUF (%)	0,0	0,0	0,0	0,0	0,1	0,6	1,5	1,1	1,0	2,4	0,0	0,0	0,6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 03 Jan 1979 Lifetime Generation: 72794.0 GW(e).h
 Date of First Criticality: 06 Jan 1987 Cumulative Energy Availability Factor: 83.4%
 Date of Grid Connection: 06 Nov 1987 Cumulative Load Factor: 85.1%
 Date of Commercial Operation: 19/07/1987 Cumulative Unit Capability Factor: 84.3%
 Cumulative Energy Unavailability Factor: 16.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	1596,5	408	99,9	99,9	98,2	98,2	88,6	88,6	4117	93,2
1988	2764,0	408	74,5	83,0	73,8	82,0	77,1	81,0	7092	80,7
1989	2984,5	408	80,8	82,1	80,4	81,3	83,5	82,0	7314	83,5
1990	2995,3	408	82,8	82,3	80,0	80,9	83,8	82,5	7836	89,5
1991	2672,0	408	78,0	81,3	77,9	80,3	74,8	80,8	7301	83,3
1992	3328,4	408	84,5	81,9	83,7	80,9	92,9	83,0	7614	86,7
1993	2939,8	448	62,1	78,6	62,1	77,8	74,9	81,6	6859	78,3
1994	3259,8	448	84,5	79,5	83,1	78,5	83,1	81,8	7538	86,1
1995	3311,1	448	85,5	80,2	85,3	79,4	84,4	82,2	7712	88,0
1996	3202,1	412	88,2	81,0	87,1	80,2	88,5	82,8	7762	88,4
1997	3149,2	440	80,9	81,0	80,9	80,2	81,7	82,7	7202	82,2
1998	3078,6	412	85,7	81,4	83,8	80,5	85,3	82,9	7536	86,0
1999	3179,4	412	88,6	82,0	86,6	81,0	88,1	83,3	7792	88,9
2000	3234,5	412	89,5	82,5	88,1	81,5	89,4	83,8	7839	89,2
2001	3258,1	412	90,4	83,1	89,2	82,1	90,3	84,2	7946	90,7
2002	2748,2	412	77,3	82,7	75,6	81,6	76,1	83,7	6745	77,0
2003	3309,8	412	91,4	83,2	90,7	82,2	91,7	84,2	8009	91,4
2004	3335,4	412	91,1	83,6	90,9	82,7	92,2	84,6	8029	91,4
2005	3267,0	412	90,3	84,0	89,6	83,0	90,5	84,9	8008	91,4
2006	3159,5	412	87,8	84,2	86,9	83,2	87,5	85,1	7704	87,9
2007	3319,0	427	88,7	84,4	88,1	83,5	88,7	85,3	7854	89,7
2008	3438,7	427	90,7	84,7	90,3	83,8	91,7	85,6	8010	91,2
2009	3100,5	427	82,0	84,6	81,8	83,7	82,9	85,4	7247	82,7
2010	2895,1	427	77,3	84,3	76,7	83,4	77,4	85,1	6846	78,2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					20	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1901			934		
D. Inspection, maintenance or repair without refuelling				77		
J. Grid limitation, failure or grid unavailability					2	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
L. Human factor related		13			0	
Subtotal	1901	13	0	1011	22	5
Total		1914			1038	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		5
15. Reactor Cooling Systems		7
32. Feedwater and Main Steam System		4
33. Circulating Water System		0
35. All other I&C Systems		1
42. Electrical Power Supply Systems		1
Total	0	18

CZ-23 TEMELIN-1

Operator: CEZ (CZECH POWER COMPANY , CEZ a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 963.0 MW(e)
 Design Net Capacity: 912.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6305.6 GW(e).h
 Energy Availability Factor: 74.5%
 Load Factor: 74.7%
 Operating Factor: 75.3%
 Energy Unavailability Factor: 25.5%
 Total Off-line Time: 2166 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	718,4	620,1	720,4	699,6	717,9	682,7	338,7	0,0	0,0	390,5	697,8	719,7	6305,6
EAF (%)	100,0	95,4	100,0	100,0	100,0	98,6	47,3	0,0	0,0	54,8	100,0	100,0	74,5
UCF (%)	100,0	95,4	100,0	100,0	100,0	98,8	51,0	0,0	0,0	54,8	100,0	100,0	74,8
LF (%)	100,3	95,8	100,7	100,9	100,2	98,5	47,3	0,0	0,0	54,4	100,6	100,4	74,7
OF (%)	100,0	96,0	100,0	100,0	100,0	100,0	51,2	0,0	0,0	58,1	100,0	100,0	75,3
EUf (%)	0,0	4,6	0,0	0,0	0,0	1,4	52,7	100,0	100,0	45,2	0,0	0,0	25,5
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	49,0	100,0	70,0	3,2	0,0	0,0	18,7
UCLF (%)	0,0	4,6	0,0	0,0	0,0	1,2	0,0	0,0	30,0	42,0	0,0	0,0	6,5
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,1	3,7	0,0	0,0	0,0	0,0	0,0	0,3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 02 Jän 1987
 Date of First Criticality: 10 Nov 2000
 Date of Grid Connection: 21/12/2000
 Date of Commercial Operation: 06 Okt 2002

Lifetime Generation: 51231.0 GW(e).h
 Cumulative Energy Availability Factor: 67.7%
 Cumulative Load Factor: 68.1%
 Cumulative Unit Capability Factor: 67.8%
 Cumulative Energy Unavailability Factor: 32.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	3675,8	930	76,1	76,1	76,1	76,1	77,0	77,0	4233	82,4
2003	5455,3	912	65,3	69,3	65,3	69,3	68,3	71,5	5861	66,9
2004	5715,8	950	68,1	68,8	68,0	68,8	68,5	70,3	6029	68,6
2005	5444,0	950	66,3	68,1	66,3	68,1	66,4	69,2	5846	66,7
2006	6124,9	930	75,7	69,8	75,7	69,8	75,2	70,5	6731	76,8
2007	4901,4	963	60,0	68,0	60,0	68,0	59,6	68,6	5282	60,3
2008	4526,4	963	53,6	65,8	53,5	65,7	53,5	66,2	4745	54,0
2009	6229,8	963	73,9	66,9	73,8	66,8	73,8	67,2	6527	74,5
2010	6305,6	963	74,8	67,8	74,5	67,7	74,7	68,1	6594	75,3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2001 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		528			855	
C. Inspection, maintenance or repair combined with refuelling	1611			1351		
D. Inspection, maintenance or repair without refuelling				20		
E. Testing of plant systems or components		27		62		
L. Human factor related					147	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)				134		
Subtotal	1611	555	0	1567	1002	0
Total		2166			2569	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2001 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		66
12. Reactor I&C Systems		20
15. Reactor Cooling Systems	526	100
16. Steam generation systems		23
21. Fuel Handling and Storage Facilities		16
31. Turbine and auxiliaries	2	500
32. Feedwater and Main Steam System		38
33. Circulating Water System		5
41. Main Generator Systems		80
42. Electrical Power Supply Systems		2
Total	528	850

CZ-24 TEMELIN-2

Operator: CEZ (CZECH POWER COMPANY, CEZ a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 963.0 MW(e)
 Design Net Capacity: 912.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6847.3 GW(e).h
 Energy Availability Factor: 80.9%
 Load Factor: 81.2%
 Operating Factor: 81.5%
 Energy Unavailability Factor: 19.1%
 Total Off-line Time: 1624 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	711,4	652,2	710,7	690,0	-0,2	-3,2	612,9	661,7	695,8	720,3	697,4	698,2	6847,3
EAFF (%)	98,7	100,0	100,0	98,5	0,0	0,0	86,2	92,3	99,9	99,9	100,0	97,0	80,9
UCF (%)	98,7	100,0	100,0	99,4	0,0	0,0	86,7	92,6	99,9	99,9	100,0	97,0	81,1
LF (%)	99,3	100,8	99,3	99,5	0,0	-0,5	85,6	92,4	100,3	100,5	100,6	97,4	81,2
OF (%)	99,3	100,0	99,2	99,6	0,0	0,0	89,9	93,0	100,0	100,0	100,0	97,4	81,5
EUFF (%)	1,3	0,0	0,0	1,5	100,0	100,0	13,8	7,7	0,1	0,1	0,0	3,0	19,1
PUFF (%)	0,0	0,0	0,0	0,6	100,0	86,7	2,4	0,0	0,0	0,0	0,0	2,9	16,1
UCLF (%)	1,3	0,0	0,0	0,0	0,0	13,3	10,9	7,4	0,1	0,1	0,0	0,1	2,8
XUFF (%)	0,0	0,0	0,0	0,9	0,0	0,0	0,5	0,3	0,0	0,0	0,0	0,0	0,1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 02 Jan 1987
 Date of First Criticality: 31/05/2002
 Date of Grid Connection: 29/12/2002
 Date of Commercial Operation: 18/04/2003

Lifetime Generation: 49493.0 GW(e).h
 Cumulative Energy Availability Factor: 76.0%
 Cumulative Load Factor: 76.5%
 Cumulative Unit Capability Factor: 76.4%
 Cumulative Energy Unavailability Factor: 24.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2003	5329,8	930	84,6	84,6	84,6	84,6	86,8	86,8	5748	87,1
2004	6340,1	950	75,2	79,2	75,2	79,2	76,0	80,6	6678	76,0
2005	4941,4	950	65,3	74,4	65,1	74,3	65,3	75,3	6135	70,0
2006	5251,9	780	65,8	72,1	65,3	71,9	65,4	72,7	5765	65,8
2007	6745,1	963	80,1	73,8	79,9	73,7	80,5	74,4	7051	80,5
2008	6978,7	963	83,2	75,5	82,6	75,3	82,5	75,8	7420	84,5
2009	6363,2	963	76,8	75,7	75,4	75,3	75,4	75,8	6756	77,1
2010	6847,3	963	81,1	76,4	80,9	76,0	81,2	76,5	7135	81,5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2002 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		200			371	
C. Inspection, maintenance or repair combined with refuelling	1371			1050		
D. Inspection, maintenance or repair without refuelling				100		
E. Testing of plant systems or components	19	28		42	2	
J. Grid limitation, failure or grid unavailability			6			
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						0
L. Human factor related					63	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	1390	228	6	1192	436	1
Total		1624			1629	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2002 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		58
12. Reactor I&C Systems		7
15. Reactor Cooling Systems	132	25
16. Steam generation systems		37
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries	7	81
32. Feedwater and Main Steam System	32	12
35. All other I&C Systems		66
41. Main Generator Systems	29	23
42. Electrical Power Supply Systems		55
Total	200	367

FI-1 LOVIISA-1

Operator: FORTUMPH (FORTUM POWER AND HEAT OY (former IVO))
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 488.0 MW(e)
Design Net Capacity: 420.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3955.6 GW(e).h
Energy Availability Factor: 91.9%
Load Factor: 92.5%
Operating Factor: 92.7%
Energy Unavailability Factor: 8.1%
Total Off-line Time: 637 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	370.3	333.6	368.5	357.8	366.9	352.0	330.2	72.8	312.0	365.2	356.4	370.0	3955.6
EAF (%)	100.0	100.0	99.6	100.0	100.0	99.8	92.8	21.5	91.5	100.0	99.7	100.0	91.9
UCF (%)	100.0	100.0	99.6	100.0	100.0	99.8	94.8	23.9	91.5	100.0	99.7	100.0	92.3
LF (%)	102.0	101.7	101.6	101.8	101.1	100.2	90.9	20.0	88.8	100.5	101.4	101.9	92.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	96.4	23.8	94.0	100.0	100.0	100.0	92.7
EUF (%)	0.0	0.0	0.4	0.0	0.0	0.2	7.2	78.5	8.5	0.0	0.3	0.0	8.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.2	0.0	76.1	7.1	0.0	0.0	0.0	7.1
UCLF (%)	0.0	0.0	0.4	0.0	0.0	0.0	5.2	0.0	1.4	0.0	0.3	0.0	0.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.1	2.4	0.0	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

GOOD PRODUCTION YEAR AND ONLY SMALL PRODUCTION LOSSES. UNIT WAS OPERATING AT BASE LOAD MODE. UNIT WAS STARTED AFTER ANNUAL OUTAGE AS SCHEDULED BUT LINEAR HEAT RATING OF THE NEW FUEL WAS LIMITING THE POWER 2-3 % THE WHOLE SEPTEMBER. COLD WINTER CAUSED SOME SMALL INCIDENTS BUT SAFETY OR PRODUCTION WERE NOT DIRECTLY AFFECTED.

5. Historical Summary

Date of Construction Start: 05 Jan 1971
Date of First Criticality: 21/01/1977
Date of Grid Connection: 02 Aug 1977
Date of Commercial Operation: 05 Sep 1977

Lifetime Generation: 117993.1 GW(e).h
Cumulative Energy Availability Factor: 87.1%
Cumulative Load Factor: 86.8%
Cumulative Unit Capability Factor: 87.5%
Cumulative Energy Unavailability Factor: 12.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	2118.6	431	83.8	83.8	83.8	83.8	83.8	83.8	5591	95.1
1978	2975.8	430	78.9	80.9	78.9	80.9	79.0	80.9	7531	86.0
1979	2901.7	405	81.8	81.2	81.8	81.2	81.8	81.2	7404	84.5
1980	1407.8	445	36.6	68.5	36.6	68.5	36.0	68.4	3482	39.6
1981	3105.1	440	81.9	71.5	81.9	71.5	80.6	71.0	7642	87.2
1982	3245.4	440	84.2	73.8	84.2	73.8	84.2	73.4	7576	86.5
1983	3337.4	445	86.7	75.7	86.7	75.7	85.6	75.3	7982	91.1
1984	3343.9	445	85.8	77.1	85.8	77.1	85.5	76.7	7653	87.1
1985	3600.0	440	92.5	78.9	92.5	78.9	93.4	78.6	8248	94.2
1986	3522.4	445	91.1	80.2	91.1	80.2	90.4	79.8	8093	92.4
1987	3600.4	445	94.6	81.5	94.6	81.5	92.4	81.0	8257	94.3
1988	3354.6	445	87.0	82.0	87.0	82.0	85.8	81.5	7678	87.4
1989	3575.7	445	92.8	82.9	92.6	82.9	91.7	82.3	8183	93.4
1990	3271.1	445	85.5	83.1	85.5	83.1	83.9	82.4	7605	86.8
1991	3360.9	445	88.8	83.5	88.6	83.4	86.2	82.7	7927	90.5
1992	3108.4	445	80.3	83.3	80.2	83.2	79.5	82.5	7186	81.8
1993	3443.2	445	89.5	83.6	89.5	83.6	88.4	82.8	8052	92.0
1994	3497.6	445	90.8	84.1	90.7	84.0	89.7	83.2	8017	91.5
1995	3389.1	445	88.5	84.3	87.7	84.2	86.9	83.4	7834	89.4
1996	3203.5	445	82.5	84.2	82.0	84.1	82.0	83.3	7281	82.9
1997	3794.8	445	93.9	84.7	93.0	84.5	97.3	84.0	8309	94.9
1998	3852.4	488	93.4	85.1	91.3	84.9	90.1	84.3	8234	94.0
1999	3883.3	488	92.4	85.5	91.6	85.2	90.8	84.6	8304	94.8
2000	3618.0	488	86.5	85.5	84.9	85.2	84.4	84.6	7720	87.9
2001	3921.0	488	93.4	85.9	92.4	85.5	91.7	84.9	8233	94.0
2002	3790.1	488	91.4	86.1	89.3	85.7	88.7	85.1	8095	92.4
2003	3939.0	488	93.2	86.4	92.4	85.9	92.1	85.4	8194	93.5
2004	3715.0	488	86.9	86.4	86.5	86.0	86.7	85.4	7647	87.0
2005	4062.4	488	95.0	86.7	94.6	86.3	95.0	85.8	8351	95.3
2006	3964.8	488	92.6	86.9	92.1	86.5	92.7	86.0	8138	92.9
2007	4028.1	488	94.0	87.2	93.5	86.7	94.2	86.3	8285	94.6
2008	3671.8	488	84.9	87.1	84.5	86.7	85.7	86.3	7571	86.2
2009	4084.9	488	94.8	87.4	94.8	86.9	95.6	86.6	8345	95.3
2010	3955.6	488	92.3	87.5	91.9	87.1	92.5	86.8	8123	92.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		27			201	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	600			705	8	
D. Inspection, maintenance or repair without refuelling				17		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	1	5
L. Human factor related		10				
Z. Others					7	
Subtotal	600	37	0	724	218	5
Total		637			947	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		13
14. Safety Systems		4
15. Reactor Cooling Systems		154
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System	27	7
42. Electrical Power Supply Systems		1
Total	27	197

FI-2 LOVIISA-2

Operator: FORTUMPH (FORTUM POWER AND HEAT OY (former IVO))

Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 488.0 MW(e)
 Design Net Capacity: 420.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3789.1 GW(e).h
 Energy Availability Factor: 88.1%
 Load Factor: 88.6%
 Operating Factor: 89.0%
 Energy Unavailability Factor: 11.9%
 Total Off-line Time: 963 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	369,7	333,3	368,9	357,9	366,5	352,9	354,2	326,8	32,8	196,4	358,2	371,4	3789,1
EAF (%)	100,0	100,0	100,0	100,0	100,0	100,0	99,3	93,9	10,0	53,7	100,0	100,0	88,1
UCF (%)	100,0	100,0	100,0	100,0	100,0	100,0	99,8	100,0	11,9	53,7	100,0	100,0	88,8
LF (%)	101,8	101,6	101,7	101,9	101,0	100,4	97,6	90,0	9,3	54,0	102,0	102,3	88,6
OF (%)	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	11,9	55,8	100,0	100,0	89,0
EUf (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,7	6,1	90,0	46,3	0,0	0,0	11,9
PUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,0	88,1	46,3	0,0	0,0	11,2
UCLF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,0	0,4	6,1	1,8	0,0	0,0	0,0	0,7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

GOOD PRODUCTION YEAR AND ONLY SMALL UNPLANTED PRODUCTION LOSSES. UNIT WAS OPERATING AT BASE LOAD MODE. UNIT WAS STARTED AFTER ANNUAL OUTAGE ALMOST THREE DAYS EARLIER THAN SCHEDULED. THE OVERHAUL OF ONE TURBINE UNIT DURING ANNUAL OUTAGE WAS A SUCCESS AND THE POWER OF THE TURBINE IS NOW AROUND 1,5 MW HIGHER THAN BEFORE. COLD WINTER CAUSED SOME SMALL INCIDENTS BUT SAFETY OR PRODUCTION WERE NOT DIRECTLY AFFECTED.

5. Historical Summary

Date of Construction Start: 08 Jan 1972
 Date of First Criticality: 17/10/1980
 Date of Grid Connection: 11 Apr 1980
 Date of Commercial Operation: 01 Mai 1981
 Lifetime Generation: 108244.9 GW(e).h
 Cumulative Energy Availability Factor: 88.8%
 Cumulative Load Factor: 88.6%
 Cumulative Unit Capability Factor: 89.5%
 Cumulative Energy Unavailability Factor: 11.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	2714,2	440	72,2	72,2	72,2	72,2	70,4	70,4	7062	80,6
1982	2997,4	440	78,0	75,1	78,0	75,1	77,8	74,1	7046	80,4
1983	3474,5	445	90,1	80,1	90,1	80,1	89,1	79,1	8063	92,0
1984	3608,6	445	92,6	83,3	92,6	83,3	92,3	82,5	8251	93,9
1985	3549,8	440	92,2	85,0	92,2	85,0	92,1	84,4	8162	93,2
1986	3174,9	445	81,5	84,4	81,5	84,4	81,4	83,9	7273	83,0
1987	3572,1	445	93,4	85,7	93,4	85,7	91,6	85,0	8242	94,1
1988	3602,3	445	94,7	86,8	94,7	86,8	92,2	85,9	8305	94,5
1989	3551,0	445	91,8	87,4	91,7	87,4	91,1	86,5	8128	92,8
1990	3251,1	445	85,3	87,2	85,3	87,2	83,4	86,2	7584	86,6
1991	3442,2	445	89,9	87,4	89,0	87,3	88,3	86,4	7941	90,7
1992	3468,4	445	89,5	87,6	89,1	87,5	88,7	86,6	7931	90,3
1993	3550,8	445	91,3	87,9	91,2	87,8	91,2	86,9	8050	92,0
1994	3124,7	445	81,2	87,4	80,5	87,3	80,2	86,4	7170	81,8
1995	3060,3	445	78,4	86,8	77,6	86,6	78,5	85,9	7064	80,6
1996	3621,3	445	93,1	87,2	92,7	87,0	92,6	86,3	8227	93,7
1997	3804,7	445	92,9	87,5	92,0	87,3	97,6	87,0	8267	94,4
1998	3687,9	488	88,6	87,6	86,4	87,2	86,3	86,9	7892	90,1
1999	3974,3	488	94,2	88,0	93,5	87,6	93,0	87,3	8281	94,5
2000	3885,1	488	94,1	88,3	90,9	87,8	90,6	87,5	8314	94,6
2001	3781,1	488	92,3	88,5	89,6	87,9	88,4	87,5	8149	93,0
2002	3498,7	488	84,5	88,3	82,6	87,6	81,8	87,2	7463	85,2
2003	3736,7	488	90,1	88,4	90,0	87,7	87,4	87,3	8358	95,4
2004	4009,2	488	93,6	88,6	93,1	88,0	93,5	87,5	8231	93,7
2005	4076,1	488	95,4	88,9	94,5	88,2	95,4	87,9	8376	95,6
2006	3766,6	488	88,5	88,9	87,5	88,2	88,1	87,9	7863	89,8
2007	4090,9	488	95,5	89,2	94,9	88,5	95,7	88,2	8403	95,9
2008	3998,0	488	93,5	89,3	92,5	88,6	93,3	88,4	8240	93,8
2009	4063,8	488	94,6	89,5	94,3	88,8	95,1	88,6	8318	95,0
2010	3789,1	488	88,8	89,5	88,1	88,8	88,6	88,6	7797	89,0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					91	
C. Inspection, maintenance or repair combined with refuelling	963			654		
D. Inspection, maintenance or repair without refuelling				40		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				1	2	
Z. Others						0
Subtotal	963	0	0	695	93	0
Total		963			788	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
14. Safety Systems		5
15. Reactor Cooling Systems		40
16. Steam generation systems		2
21. Fuel Handling and Storage Facilities		13
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		16
41. Main Generator Systems		0
XX. Miscellaneous Systems		0
Total	0	82

FI-3 OLKILUOTO-1

Operator: TVO (TEOLLISUUDEN VOIMA OY)
Contractor: ASEASTAL (ASEA-ATOM / STAL-LAVAL)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF) at the beginning of 2010: 860.0 MW(e)
Design Net Capacity: 660.0 MW(e)
Design Discharge Burnup: 37000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6976.9 GW(e).h
Energy Availability Factor: 91.4%
Load Factor: 91.5%
Operating Factor: 92.7%
Energy Unavailability Factor: 8.6%
Total Off-line Time: 640 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	643,8	580,3	642,5	620,0	292,1	375,2	629,0	633,4	625,9	652,1	634,0	648,6	6976,9
EAF (%)	100,0	99,8	100,0	99,8	45,9	58,7	97,1	97,7	98,9	99,8	100,0	98,9	91,4
UCF (%)	100,0	99,8	100,0	99,8	45,9	59,4	100,0	99,8	100,0	99,8	100,0	98,9	92,0
LF (%)	100,6	100,4	100,6	100,1	45,7	60,6	96,1	96,7	98,8	99,5	100,1	99,1	91,5
OF (%)	100,0	100,0	100,0	100,0	50,8	62,1	100,0	100,0	100,0	100,0	100,0	99,9	92,7
EUf (%)	0,0	0,2	0,0	0,2	54,1	41,3	2,9	2,3	1,1	0,2	0,0	1,1	8,6
PUF (%)	0,0	0,2	0,0	0,1	49,2	35,9	0,0	0,1	0,0	0,2	0,0	0,2	7,1
UCLF (%)	0,0	0,0	0,0	0,1	4,9	4,7	0,0	0,1	0,0	0,0	0,0	1,0	0,9
XUF (%)	0,0	0,0	0,0	0,0	0,0	0,7	2,9	2,1	1,1	0,0	0,0	0,0	0,6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE PLANT UNITS OPERATED SAFELY AND RELIABLY DURING THE PERIOD UNDER REVIEW. THE OUTAGE CONDUCTED AT OL1 IN 2010 WAS THE MOST EXTENSIVE MAINTENANCE OUTAGE IN THE HISTORY OF THE OLKILUOTO POWER PLANT. MAJOR WORK CARRIED OUT DURING THE OUTAGE INCLUDED. E.G. REPLACEMENT OF ALL THE FOUR LOW-PRESSURE TURBINES, REFURBISHMENT OF THE GENERATOR COOLING SYSTEM, THE MAIN SEAWATER PUMPS AND THE INNER EXTRACTION DUCTS OF THE TURBINE CONDENSER AS WELL AS REPLACEMENT OF THE INNER ISOLATION VALVES IN THE STEAM LINES OF THE REACTOR. THANKS TO THE MODERNIZATION WORK, THE EFFICIENCY OF THE TURBINE PLANT IMPROVED, AND THE ELECTRICAL OUTPUT INCREASED BY APPROXIMATELY 20 MW. THE OUTAGE LASTED ABOUT 26 DAYS.

5. Historical Summary

Date of Construction Start: 02 Jän 1974 **Lifetime Generation:** 194888.5 GW(e).h
Date of First Criticality: 21/07/1978 **Cumulative Energy Availability Factor:** 92.5%
Date of Grid Connection: 09 Feb 1978 **Cumulative Load Factor:** 92.2%
Date of Commercial Operation: 10 Okt 1979 **Cumulative Unit Capability Factor:** 92.9%
Cumulative Energy Unavailability Factor: 7.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	1265,2	660	86,9	86,9	86,9	86,9	86,8	86,8	1996	90,4
1980	4280,8	658	76,3	78,4	76,3	78,4	74,1	76,6	6849	78,0
1981	4549,2	660	80,8	79,5	80,8	79,5	78,7	77,5	7353	83,9
1982	4997,5	658	86,7	81,7	86,7	81,7	86,7	80,4	7903	90,2
1983	4808,3	669	81,9	81,7	81,9	81,7	82,0	80,7	7651	87,3
1984	5505,6	694	91,9	83,8	91,9	83,8	90,3	82,6	8247	93,9
1985	5414,5	710	88,8	84,6	88,8	84,6	87,1	83,4	8180	93,4
1986	5463,2	710	90,1	85,4	90,1	85,4	87,8	84,0	8008	91,4
1987	5636,5	710	92,1	86,2	92,1	86,2	90,6	84,9	8142	92,9
1988	5778,9	710	94,3	87,1	94,1	87,1	92,7	85,7	8248	93,9
1989	5056,2	710	83,2	86,7	83,2	86,7	81,3	85,3	7278	83,1
1990	5857,3	710	95,6	87,5	95,6	87,5	94,2	86,1	8356	95,4
1991	5873,2	710	95,7	88,2	94,9	88,1	94,4	86,8	8373	95,6
1992	5803,0	710	93,7	88,7	93,2	88,5	93,0	87,3	8251	93,9
1993	5944,9	710	95,8	89,2	95,3	89,0	95,6	87,9	8433	96,3
1994	5978,0	710	96,5	89,7	96,0	89,5	96,1	88,4	8485	96,9
1995	5931,5	710	96,1	90,1	95,5	89,9	95,4	88,9	8427	96,2
1996	5938,6	710	92,2	90,2	92,1	90,0	95,2	89,2	8212	93,5
1997	6374,2	772	93,9	90,4	93,8	90,2	94,2	89,5	8254	94,2
1998	6807,0	840	95,6	90,7	95,0	90,5	92,5	89,7	8384	95,7
1999	7111,8	840	97,2	91,1	96,4	90,9	96,6	90,1	8542	97,5
2000	7043,1	840	95,8	91,4	95,2	91,1	95,5	90,4	8448	96,2
2001	7163,8	840	97,6	91,7	97,2	91,4	97,4	90,8	8561	97,7
2002	6997,5	840	95,5	91,9	95,1	91,6	95,1	91,0	8377	95,6
2003	7127,4	840	97,1	92,1	96,5	91,8	96,9	91,3	8515	97,2
2004	7009,0	840	94,7	92,2	94,7	91,9	95,0	91,4	8329	94,8
2005	7221,1	840	97,8	92,5	97,7	92,2	98,1	91,7	8588	98,0
2006	6973,4	840	93,3	92,5	92,6	92,2	93,6	91,8	8206	93,7
2007	7334,9	860	97,4	92,7	96,7	92,4	97,4	92,0	8554	97,6
2008	7066,0	860	93,6	92,7	93,1	92,4	93,5	92,1	8288	94,4
2009	7295,8	860	97,2	92,9	96,7	92,6	96,8	92,3	8548	97,6
2010	6976,9	880	92,0	92,9	91,4	92,5	91,5	92,2	8120	92,7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		30			87	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	610			428		
D. Inspection, maintenance or repair without refuelling				17		
E. Testing of plant systems or components					5	
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					42	0
Z. Others					2	
Subtotal	610	30	0	445	136	3
Total		640			584	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1979 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems		2
14. Safety Systems		4
15. Reactor Cooling Systems		11
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	27	19
32. Feedwater and Main Steam System		2
33. Circulating Water System		1
41. Main Generator Systems	3	37
42. Electrical Power Supply Systems		0
Total	30	83

FI-4 OLKILUOTO-2

Operator: TVO (TEOLLISUUDEN VOIMA OY)
Contractor: ASEASTAL (ASEA-ATOM / STAL-LAVAL)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 860.0 MW(e)
Design Net Capacity: 660.0 MW(e)
Design Discharge Burnup: 37000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7167.3 GW(e).h
Energy Availability Factor: 94.6%
Load Factor: 95.1%
Operating Factor: 95.7%
Energy Unavailability Factor: 5.4%
Total Off-line Time: 374 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	644,3	583,7	644,9	621,3	322,5	588,4	616,5	618,3	612,4	643,1	624,4	647,4	7167,3
EAF (%)	99,7	100,0	100,0	99,7	50,3	94,7	96,5	96,7	98,6	100,0	99,8	100,0	94,6
UCF (%)	99,7	100,0	100,0	99,7	50,4	95,9	99,9	99,2	99,8	100,0	99,8	100,0	95,3
LF (%)	100,7	101,0	100,9	100,3	50,4	95,0	96,3	96,6	98,9	100,4	100,8	101,2	95,1
OF (%)	100,0	100,0	100,0	100,0	53,0	96,7	100,0	100,0	100,0	100,0	100,0	100,0	95,7
EUf (%)	0,3	0,0	0,0	0,3	49,7	5,3	3,5	3,3	1,4	0,0	0,2	0,0	5,4
PUF (%)	0,0	0,0	0,0	0,2	30,8	0,0	0,0	0,2	0,2	0,0	0,2	0,0	2,7
UCLF (%)	0,3	0,0	0,0	0,1	18,9	4,1	0,1	0,6	0,0	0,0	0,0	0,0	2,0
XUF (%)	0,0	0,0	0,0	0,0	0,0	1,2	3,4	2,5	1,2	0,0	0,0	0,0	0,7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE PLANT UNITS OPERATED SAFELY AND RELIABLY DURING THE PERIOD UNDER REVIEW. OL2 HAD A REFUELLING OUTAGE WHICH TOOK ABOUT 11 DAYS. IN ADDITION TO REFUELLING, THE MAJOR WORK INCLUDED A PERIODICAL LEAK TEST OF THE REACTOR CONTAINMENT AND INSPECTION OF TWO LOW-PRESSURE TURBINES.

5. Historical Summary

Date of Construction Start: 11 Jän 1975
Date of First Criticality: 13/10/1979
Date of Grid Connection: 18/02/1980
Date of Commercial Operation: 07 Okt 1982

Lifetime Generation: 186233.5 GW(e).h
Cumulative Energy Availability Factor: 93.7%
Cumulative Load Factor: 93.3%
Cumulative Unit Capability Factor: 94.1%
Cumulative Energy Unavailability Factor: 6.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	2256,6	658	77,7	77,7	77,7	77,7	77,6	77,6	3513	79,5
1983	5087,2	657	86,7	83,7	86,7	83,7	88,4	84,8	8221	93,8
1984	5341,3	696	89,6	86,1	89,6	86,1	87,3	85,8	8031	91,4
1985	5415,8	710	88,2	86,7	88,2	86,7	87,1	86,2	7912	90,3
1986	5840,2	710	95,1	88,6	95,1	88,6	93,9	88,0	8437	96,3
1987	5725,0	710	93,7	89,6	93,7	89,6	92,0	88,7	8379	95,7
1988	5713,2	710	92,7	90,1	92,7	90,1	91,6	89,2	8220	93,6
1989	5827,0	710	94,9	90,7	94,9	90,7	93,7	89,8	8363	95,5
1990	5749,9	710	93,8	91,1	93,8	91,1	92,4	90,1	8265	94,3
1991	5731,0	710	93,7	91,4	93,0	91,3	92,1	90,3	8216	93,8
1992	5790,4	710	94,5	91,7	93,3	91,5	92,8	90,6	8306	94,6
1993	5861,6	710	95,1	92,0	94,4	91,7	94,2	90,9	8327	95,1
1994	5732,6	710	93,2	92,1	92,3	91,8	92,2	91,0	8130	92,8
1995	5747,2	710	93,7	92,2	92,5	91,8	92,4	91,1	8236	94,0
1996	5915,4	710	95,3	92,4	95,0	92,1	94,8	91,4	8413	95,8
1997	6077,0	736	94,6	92,6	93,7	92,2	94,1	91,5	8258	94,3
1998	6628,5	840	94,3	92,7	93,2	92,2	90,1	91,4	8207	93,7
1999	7091,2	840	96,9	93,0	96,4	92,5	96,4	91,8	8505	97,1
2000	7028,9	840	95,9	93,1	95,3	92,7	95,3	92,0	8457	96,3
2001	6988,0	840	95,1	93,3	95,1	92,8	95,0	92,2	8387	95,7
2002	7108,5	840	97,0	93,5	96,8	93,1	96,6	92,4	8472	96,7
2003	7026,9	840	95,5	93,6	95,2	93,2	95,5	92,6	8378	95,6
2004	7080,7	840	95,8	93,7	95,8	93,3	96,0	92,7	8485	96,6
2005	6996,7	840	93,8	93,7	93,8	93,3	94,0	92,8	8248	94,2
2006	7294,4	860	97,4	93,9	96,4	93,5	96,8	93,0	8562	97,7
2007	7051,3	860	94,0	93,9	93,2	93,5	93,6	93,0	8258	94,3
2008	7313,8	860	96,9	94,0	96,3	93,6	96,8	93,2	8579	97,7
2009	7156,3	860	95,2	94,0	94,5	93,6	95,0	93,2	8365	95,5
2010	7167,3	860	95,3	94,1	94,6	93,7	95,1	93,3	8386	95,7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		157			311	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling	216			376		
D. Inspection, maintenance or repair without refuelling				14		
E. Testing of plant systems or components				22		
H. Nuclear regulatory requirements					0	
J. Grid limitation, failure or grid unavailability						11
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	4
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
P. Fire					0	
Z. Others					1	
Subtotal	216	157	0	412	323	15
Total		373			750	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems		0
13. Reactor Auxiliary Systems		0
14. Safety Systems		2
15. Reactor Cooling Systems	133	10
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System	24	6
33. Circulating Water System		1
35. All other I&C Systems		0
41. Main Generator Systems		269
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems		0
Total	157	304

FR-54 BELLEVILLE-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1310.0 MW(e)
Design Net Capacity: 1310.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6650.3 GW(e).h
Energy Availability Factor: 58.2%
Load Factor: 58.0%
Operating Factor: 61.3%
Energy Unavailability Factor: 41.8%
Total Off-line Time: 3390 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	950.7	849.3	788.6	0.0	0.0	0.0	0.0	401.1	833.9	934.9	931.8	959.9	6650.3
EAF (%)	97.6	96.5	81.0	0.0	0.0	0.0	0.0	41.3	89.4	97.2	98.7	98.4	58.2
UCF (%)	98.2	97.6	81.7	0.0	0.0	0.0	0.0	3.2	42.0	91.0	99.7	99.6	59.2
LF (%)	97.5	96.5	81.0	0.0	0.0	0.0	0.0	41.2	88.4	95.8	98.8	98.5	58.0
OF (%)	100.0	100.0	84.0	0.0	0.0	0.0	0.0	55.1	98.8	100.0	100.0	100.0	61.3
EUf (%)	2.4	3.5	19.0	100.0	100.0	100.0	100.0	58.7	10.6	2.8	1.3	1.6	41.8
PUF (%)	0.1	0.0	16.9	100.0	100.0	100.0	35.5	10.9	0.0	0.0	0.0	0.0	30.3
UCLF (%)	1.7	2.4	1.4	0.0	0.0	0.0	61.3	47.1	9.1	0.3	0.3	0.4	10.5
XUF (%)	0.6	1.1	0.7	0.0	0.0	0.0	3.2	0.7	1.6	2.4	0.9	1.2	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 05 Jan 1980 Lifetime Generation: 183541.7 GW(e).h
Date of First Criticality: 09 Sep 1987 Cumulative Energy Availability Factor: 75.2%
Date of Grid Connection: 14/10/1987 Cumulative Load Factor: 69.5%
Date of Commercial Operation: 06 Jan 1988 Cumulative Unit Capability Factor: 76.5%
Cumulative Energy Unavailability Factor: 24.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	4334.0	1310	86.1	86.1	85.8	85.8	64.4	64.4	4421	86.1
1989	5152.6	1310	46.5	61.1	46.0	60.7	44.9	52.1	4244	48.4
1990	7914.3	1310	71.4	65.1	71.2	64.7	69.0	58.6	6408	73.2
1991	8660.2	1310	80.8	69.5	79.3	68.8	75.5	63.3	7092	81.0
1992	8494.3	1310	91.8	74.4	91.2	73.7	73.8	65.6	7600	86.5
1993	7921.5	1310	77.5	74.9	71.3	73.2	69.0	66.2	6873	78.5
1994	6575.8	1310	65.2	73.4	64.0	71.8	57.3	64.9	5848	66.8
1995	7740.9	1310	76.2	73.8	73.4	72.1	67.5	65.2	6796	77.6
1996	7365.1	1310	76.8	74.2	76.5	72.6	64.0	65.1	6002	68.3
1997	9785.3	1310	93.4	76.2	93.2	74.7	85.3	67.2	8294	94.7
1998	5740.9	1310	53.7	74.0	51.2	72.5	50.0	65.6	4865	55.5
1999	9580.5	1310	92.0	75.6	90.4	74.0	83.5	67.1	7957	90.8
2000	4238.6	1310	38.0	72.6	37.9	71.2	36.8	64.7	3459	39.4
2001	9564.5	1310	87.3	73.7	86.8	72.3	83.3	66.1	7774	88.7
2002	9567.3	1310	99.6	75.5	98.9	74.1	83.4	67.3	8447	96.4
2003	8401.7	1310	77.6	75.6	75.4	74.2	73.2	67.6	6871	78.4
2004	9291.0	1310	88.6	76.4	88.0	75.1	80.7	68.4	7645	87.0
2005	10236.4	1310	98.8	77.7	97.1	76.3	89.2	69.6	8646	98.7
2006	7926.7	1310	77.1	77.6	74.8	76.2	69.1	69.6	6870	78.4
2007	8512.1	1310	77.5	77.6	75.8	76.2	74.2	69.8	7213	82.3
2008	6305.0	1310	55.3	76.5	55.2	75.2	54.8	69.1	5615	63.9
2009	10402.3	1310	93.0	77.3	92.1	76.0	90.6	70.1	8350	95.3
2010	6650.3	1310	59.2	76.5	58.2	75.2	58.0	69.5	5370	61.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		754			502	
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling	2567			1015	9	
D. Inspection, maintenance or repair without refuelling				8		
E. Testing of plant systems or components				53	3	0
H. Nuclear regulatory requirements					97	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					73	1
L. Human factor related					4	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)			24			2
Z. Others		48			0	
Subtotal	2567	802	24	1076	704	4
Total		3393			1784	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	105	23
12. Reactor I&C Systems	24	67
13. Reactor Auxiliary Systems		42
14. Safety Systems		32
15. Reactor Cooling Systems	48	37
16. Steam generation systems	48	55
21. Fuel Handling and Storage Facilities	24	2
31. Turbine and auxiliaries	11	54
32. Feedwater and Main Steam System		83
35. All other I&C Systems		0
41. Main Generator Systems	86	41
42. Electrical Power Supply Systems	48	18
XX. Miscellaneous Systems	360	11
Total	754	465

FR-55 BELLEVILLE-2

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1310.0 MW(e)
 Design Net Capacity: 1310.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7869.7 GW(e).h
 Energy Availability Factor: 70.0%
 Load Factor: 68.6%
 Operating Factor: 72.6%
 Energy Unavailability Factor: 30.0%
 Total Off-line Time: 2399 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	947.4	853.6	938.3	850.6	873.1	863.9	911.3	905.7	720.6	0.0	0.0	5.3	7869.7
EAF (%)	97.2	97.0	96.7	90.9	93.8	97.5	95.9	96.0	77.0	0.0	0.0	0.6	70.0
UCF (%)	97.5	97.0	97.7	92.4	98.3	99.0	99.1	98.3	79.3	0.0	0.0	25.3	73.5
LF (%)	97.2	97.0	96.4	90.2	89.6	91.6	93.5	92.9	76.4	0.0	0.0	0.5	68.6
OF (%)	100.0	100.0	100.0	93.9	96.4	100.0	100.0	99.3	80.3	0.0	0.0	3.8	72.6
EUf (%)	2.8	3.0	3.3	9.1	6.2	2.5	4.1	4.0	23.0	100.0	100.0	99.4	30.0
PUf (%)	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	20.2	100.0	100.0	36.5	21.5
UCLF (%)	2.6	3.0	2.3	7.6	1.7	0.9	0.9	1.6	0.6	0.0	0.0	38.2	5.0
XUF (%)	0.2	0.0	1.0	1.4	4.5	1.5	3.2	2.3	2.3	0.0	0.0	24.7	3.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 08 Jan 1980
 Date of First Criticality: 25/05/1988
 Date of Grid Connection: 07 Jun 1988
 Date of Commercial Operation: 01 Jan 1989

Lifetime Generation: 181569.8 GW(e).h
 Cumulative Energy Availability Factor: 76.9%
 Cumulative Load Factor: 71.1%
 Cumulative Unit Capability Factor: 78.9%
 Cumulative Energy Unavailability Factor: 23.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	8505.7	1310	87.0	87.0	86.6	86.6	74.1	74.1	7419	84.7
1990	6324.0	1310	58.4	72.7	56.9	71.8	55.1	64.6	5350	61.1
1991	7876.3	1310	73.3	72.9	70.3	71.3	68.6	66.0	6578	75.1
1992	8262.1	1310	75.9	73.7	75.3	72.3	71.8	67.4	6904	78.6
1993	8871.3	1310	83.4	75.6	80.1	73.8	77.3	69.4	7435	84.9
1994	8241.3	1310	80.4	76.4	76.9	74.4	71.8	69.8	7122	81.3
1995	7960.5	1310	99.3	79.7	97.5	77.7	69.4	69.7	7438	84.9
1996	7229.8	1310	74.5	79.0	71.2	76.8	62.8	68.9	6666	75.9
1997	8508.1	1310	84.9	79.7	82.0	77.4	74.1	69.5	7339	83.8
1998	5068.0	1310	45.0	76.2	45.0	74.2	44.2	66.9	4239	48.4
1999	4899.3	1310	44.8	73.3	43.3	71.4	42.7	64.7	4040	46.1
2000	9882.5	1310	97.4	75.4	96.7	73.5	85.9	66.5	8271	94.2
2001	8458.0	1310	79.2	75.7	78.6	73.9	73.7	67.0	6935	79.2
2002	9378.7	1310	86.1	76.4	84.3	74.6	81.7	68.1	7687	87.8
2003	8624.7	1310	80.4	76.7	79.4	74.9	75.2	68.6	7135	81.4
2004	10202.6	1310	98.0	78.0	97.1	76.3	88.7	69.8	8621	98.1
2005	9242.3	1310	86.9	78.5	84.4	76.8	80.5	70.5	7767	88.7
2006	8743.6	1310	81.7	78.7	79.1	76.9	76.2	70.8	7309	83.4
2007	9516.0	1310	89.4	79.3	88.6	77.5	82.9	71.4	7895	90.1
2008	9734.9	1310	92.6	79.9	92.4	78.3	84.6	72.1	8327	94.8
2009	6310.9	1310	62.7	79.1	55.6	77.2	55.0	71.3	5166	59.0
2010	7869.7	1310	73.5	78.9	70.0	76.9	68.6	71.1	6361	72.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		273			348	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	1855			974		
E. Testing of plant systems or components				57		
H. Nuclear regulatory requirements					133	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					61	
L. Human factor related		39			6	0
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			184			17
Z. Others		24	24		2	
Subtotal	1855	336	208	1031	563	18
Total		2399			1612	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		40
12. Reactor I&C Systems	140	50
13. Reactor Auxiliary Systems		11
14. Safety Systems		27
15. Reactor Cooling Systems		44
16. Steam generation systems		30
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		3
31. Turbine and auxiliaries	5	35
32. Feedwater and Main Steam System		14
33. Circulating Water System		2
35. All other I&C Systems		3
41. Main Generator Systems		5
42. Electrical Power Supply Systems	5	10
XX. Miscellaneous Systems	123	28
Total	273	303

FR-32 BLAYAIS-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6634.7 GW(e).h
Energy Availability Factor: 86.1%
Load Factor: 83.2%
Operating Factor: 87.7%
Energy Unavailability Factor: 13.9%
Total Off-line Time: 1081 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	669.0	602.6	566.6	0.0	431.3	615.4	611.9	611.3	595.2	621.6	636.9	673.0	6634.7
EAF (%)	99.8	99.9	83.9	0.0	63.8	99.0	95.8	98.1	98.3	94.9	99.6	100.0	86.1
UCF (%)	99.8	99.9	83.9	0.0	63.8	99.4	99.7	99.7	99.5	98.6	99.6	100.0	87.0
LF (%)	98.8	98.5	83.8	0.0	63.7	93.9	90.4	90.3	90.8	91.7	97.2	99.4	83.2
OF (%)	100.0	100.0	84.3	0.0	68.1	100.0	100.0	100.0	100.0	99.1	100.0	100.0	87.7
EUf (%)	0.2	0.1	16.1	100.0	36.2	1.0	4.2	1.9	1.7	5.1	0.4	0.0	13.9
PUF (%)	0.0	0.0	16.0	100.0	19.8	0.3	0.0	0.0	0.0	0.0	0.1	0.0	11.3
UCLF (%)	0.2	0.1	0.1	0.0	16.4	0.2	0.3	0.3	0.5	1.5	0.3	0.0	1.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	3.9	1.6	1.2	3.6	0.0	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 01 Jan 1977 Lifetime Generation: 168150.5 GW(e).h
Date of First Criticality: 20/05/1981 Cumulative Energy Availability Factor: 76.7%
Date of Grid Connection: 06 Dec 1981 Cumulative Load Factor: 72.0%
Date of Commercial Operation: 12 Jan 1981 Cumulative Unit Capability Factor: 79.4%
Cumulative Energy Unavailability Factor: 23.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	449.0	915	65.6	65.6	65.6	65.6	65.6	65.6	522	70.2
1982	6129.8	910	81.5	80.2	81.5	80.2	76.9	76.0	7588	86.6
1983	3453.0	910	43.9	62.8	43.9	62.8	43.3	60.3	4285	48.9
1984	6509.0	910	84.6	69.9	84.6	69.9	81.4	67.2	7536	85.8
1985	6225.2	910	83.0	73.1	82.8	73.0	78.1	69.8	7348	83.9
1986	6460.6	910	87.8	76.0	87.0	75.8	81.0	72.1	7754	88.5
1987	5586.6	910	78.2	76.3	76.2	75.8	70.1	71.7	6793	77.5
1988	5730.0	910	82.1	77.1	81.3	76.6	71.7	71.7	7069	80.5
1989	6222.4	910	84.2	78.0	83.3	77.4	78.1	72.5	7419	84.7
1990	5822.6	910	77.2	77.9	76.9	77.4	73.0	72.6	6834	78.0
1991	6379.0	910	83.8	78.5	83.3	78.0	80.0	73.3	7400	84.5
1992	4349.2	910	57.5	76.6	56.6	76.0	54.4	71.6	5079	57.8
1993	5979.2	910	83.7	77.2	78.3	76.2	75.0	71.9	7253	82.8
1994	3474.9	910	86.6	77.9	85.8	77.0	43.6	69.7	5119	58.4
1995	6075.8	910	87.1	78.6	84.3	77.5	76.2	70.2	7206	82.3
1996	6639.1	910	88.5	79.2	85.6	78.0	83.1	71.0	7798	88.8
1997	6196.6	910	90.1	79.9	84.6	78.4	77.7	71.4	7621	87.0
1998	5917.6	910	81.1	80.0	78.2	78.4	74.2	71.6	7078	80.8
1999	6046.8	910	80.9	80.0	77.9	78.4	75.9	71.8	7082	80.8
2000	2854.1	910	53.4	78.6	36.6	76.2	35.7	69.9	3602	41.0
2001	4881.5	910	66.2	78.0	64.0	75.6	61.2	69.5	5768	65.8
2002	6861.1	910	95.0	78.8	93.0	76.4	86.1	70.3	8251	94.2
2003	4541.7	910	61.8	78.0	58.1	75.6	57.0	69.7	5321	60.7
2004	6144.3	910	81.5	78.2	79.2	75.7	76.9	70.0	7217	82.2
2005	6883.6	910	87.7	78.6	86.8	76.2	86.3	70.7	7841	89.5
2006	6508.0	910	84.0	78.8	81.6	76.4	81.6	71.1	7440	84.9
2007	6891.0	910	88.3	79.2	86.4	76.8	86.4	71.7	7791	88.9
2008	6678.7	910	86.1	79.4	83.7	77.0	83.6	72.1	7651	87.1
2009	4604.6	910	71.4	79.1	58.4	76.4	57.8	71.6	5461	62.3
2010	6634.7	910	87.0	79.4	86.1	76.7	83.2	72.0	7679	87.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		7			382	0
B. Refuelling without a maintenance				109		
C. Inspection, maintenance or repair combined with refuelling	959			912	5	
D. Inspection, maintenance or repair without refuelling				39		
E. Testing of plant systems or components				1	1	
H. Nuclear regulatory requirements					71	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					26	50
L. Human factor related					13	1
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						7
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						26
Z. Others		115			12	
Subtotal	959	122	0	1061	510	84
Total		1081			1655	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			28
12. Reactor I&C Systems			43
13. Reactor Auxiliary Systems			4
14. Safety Systems			4
15. Reactor Cooling Systems			72
16. Steam generation systems			10
17. Safety I&C Systems (excluding reactor I&C)			0
21. Fuel Handling and Storage Facilities			1
31. Turbine and auxiliaries			30
32. Feedwater and Main Steam System			34
33. Circulating Water System			0
35. All other I&C Systems			0
41. Main Generator Systems	7		81
42. Electrical Power Supply Systems			13
Total		7	320

FR-33 BLAYAIS-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6341.1 GW(e).h
Energy Availability Factor: 78.2%
Load Factor: 79.5%
Operating Factor: 79.0%
Energy Unavailability Factor: 21.8%
Total Off-line Time: 1841 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	696.1	626.1	689.3	668.2	687.6	655.9	325.7	237.7	529.8	0.0	531.1	693.6	6341.1
EAF (%)	99.9	99.6	100.0	99.9	100.0	99.4	48.2	35.0	80.4	0.0	79.4	100.0	78.2
UCF (%)	99.9	99.7	100.0	99.9	100.0	100.0	51.7	35.0	80.4	6.6	79.4	100.0	79.1
LF (%)	102.8	102.4	102.0	102.0	101.6	100.1	48.1	35.1	80.9	0.0	81.1	102.4	79.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	51.7	38.2	80.6	0.0	81.0	100.0	79.0
EUf (%)	0.1	0.4	0.0	0.1	0.0	0.6	51.8	65.0	19.6	100.0	20.6	0.0	21.8
PUF (%)	0.1	0.0	0.0	0.1	0.0	0.0	48.3	43.8	0.1	0.0	0.0	0.0	7.8
UCLF (%)	0.0	0.4	0.0	0.0	0.0	0.0	0.0	21.2	19.6	93.4	20.6	0.0	13.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.5	3.5	0.0	0.0	6.6	0.0	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 01 Jan 1977 Lifetime Generation: 172456.5 GW(e).h
Date of First Criticality: 28/06/1982 Cumulative Energy Availability Factor: 80.2%
Date of Grid Connection: 17/07/1982 Cumulative Load Factor: 76.5%
Date of Commercial Operation: 02 Jan 1983 Cumulative Unit Capability Factor: 82.5%
Cumulative Energy Unavailability Factor: 19.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	4490.0	910	62.3	62.3	62.3	62.3	61.6	61.6	5120	63.9
1984	6645.0	910	85.5	74.5	85.5	74.5	83.1	72.8	7716	87.8
1985	6819.7	910	90.0	79.8	89.9	79.8	85.5	77.2	7937	90.6
1986	6048.4	910	83.2	80.7	82.9	80.5	75.9	76.9	7142	81.5
1987	5987.1	910	84.8	81.5	84.2	81.3	75.1	76.5	7218	82.4
1988	4162.0	910	91.2	83.1	90.8	82.9	52.1	72.4	5718	65.1
1989	5561.0	910	77.0	82.3	73.4	81.5	69.8	72.0	6720	76.7
1990	5656.4	910	87.4	82.9	85.7	82.1	71.0	71.9	7381	84.3
1991	5326.5	910	78.3	82.4	75.1	81.3	66.8	71.3	6789	77.5
1992	5953.3	910	86.9	82.8	83.7	81.5	74.5	71.6	7505	85.4
1993	5253.2	910	71.0	81.8	67.0	80.2	65.9	71.1	6203	70.8
1994	6692.6	910	88.7	82.3	88.1	80.9	84.0	72.2	7658	87.4
1995	6725.5	910	87.9	82.8	85.6	81.2	84.4	73.1	7775	88.8
1996	6709.8	910	87.4	83.1	85.0	81.5	83.9	73.9	7587	86.4
1997	6769.9	910	88.7	83.5	84.8	81.7	84.9	74.6	7681	87.7
1998	6974.3	910	90.0	83.9	87.2	82.1	87.5	75.4	7883	90.0
1999	5836.2	910	75.1	83.4	73.1	81.5	73.2	75.3	6544	74.7
2000	4941.1	910	75.2	82.9	63.0	80.5	61.8	74.6	5592	63.7
2001	6548.0	910	83.6	83.0	81.9	80.6	82.1	75.0	7358	84.0
2002	5972.0	910	84.3	83.0	82.7	80.7	74.9	75.0	7357	84.0
2003	5181.2	910	66.0	82.2	63.7	79.9	65.0	74.5	5784	66.0
2004	6734.6	910	82.6	82.2	81.5	79.9	84.3	74.9	7346	83.6
2005	6918.8	910	85.0	82.3	84.6	80.1	86.8	75.4	7513	85.8
2006	6786.7	910	86.0	82.5	85.4	80.4	85.1	75.8	7599	86.7
2007	6035.6	910	75.8	82.2	74.3	80.1	75.7	75.8	6686	76.3
2008	7191.2	910	90.3	82.5	89.7	80.5	90.0	76.4	7977	90.8
2009	6050.5	910	83.6	82.6	75.0	80.3	75.9	76.4	6736	76.9
2010	6341.1	910	79.1	82.5	78.2	80.2	79.5	76.5	6919	79.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1131			192	
B. Refuelling without a maintenance	661			57	2	
C. Inspection, maintenance or repair combined with refuelling				1021	2	
D. Inspection, maintenance or repair without refuelling				23		
E. Testing of plant systems or components				70	0	
H. Nuclear regulatory requirements					16	0
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	48
L. Human factor related					4	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						15
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)			49			6
Z. Others					16	
Subtotal	661	1131	49	1171	241	73
Total		1841			1485	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		24
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		7
14. Safety Systems		12
15. Reactor Cooling Systems		26
16. Steam generation systems	973	4
31. Turbine and auxiliaries		17
32. Feedwater and Main Steam System		52
33. Circulating Water System		5
41. Main Generator Systems	53	7
42. Electrical Power Supply Systems	105	5
XX. Miscellaneous Systems		2
Total	1131	167

FR-34 BLAYAIS-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6679.7 GW(e).h
Energy Availability Factor: 82.2%
Load Factor: 83.8%
Operating Factor: 84.4%
Energy Unavailability Factor: 17.8%
Total Off-line Time: 1370 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	687.8	630.8	693.8	672.5	688.6	658.6	665.9	386.5	0.0	297.4	604.5	693.4	6679.7
EAF (%)	98.6	100.0	99.4	100.0	99.6	99.5	98.3	57.1	0.0	44.0	90.7	100.0	82.2
UCF (%)	98.6	100.0	99.5	100.0	99.6	99.5	99.9	64.8	0.0	45.4	90.7	100.0	83.1
LF (%)	101.6	103.2	102.6	102.6	101.7	100.5	98.3	57.1	0.0	43.9	92.3	102.4	83.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	64.2	0.0	55.7	92.5	100.0	84.4
EUUF (%)	1.4	0.0	0.6	0.0	0.4	0.5	1.7	42.9	100.0	56.0	9.3	0.0	17.8
PUF (%)	0.0	0.0	0.1	0.0	0.1	0.1	0.0	35.2	100.0	18.5	0.1	0.0	12.8
UCLF (%)	1.4	0.0	0.4	0.0	0.3	0.4	0.1	0.0	0.0	36.1	9.2	0.0	4.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.6	7.7	0.0	1.4	0.0	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 04 Jan 1978
Date of First Criticality: 29/07/1983
Date of Grid Connection: 17/08/1983
Date of Commercial Operation: 14/11/1983

Lifetime Generation: 167779.9 GW(e).h
Cumulative Energy Availability Factor: 80.6%
Cumulative Load Factor: 77.1%
Cumulative Unit Capability Factor: 82.8%
Cumulative Energy Unavailability Factor: 19.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	1164.0	910	87.4	87.4	87.4	87.4	87.4	87.4	1273	87.0
1984	5944.0	910	80.3	81.4	80.3	81.4	74.4	76.2	7055	80.3
1985	6568.9	910	87.0	83.9	86.6	83.8	82.4	79.1	7729	88.2
1986	6504.9	910	88.3	85.3	88.1	85.1	81.6	79.9	7759	88.6
1987	4304.7	910	93.9	87.4	93.5	87.1	54.0	73.7	5473	62.5
1988	5287.0	910	82.8	86.5	81.6	86.1	66.1	72.2	6708	76.4
1989	6086.4	910	82.7	85.9	78.5	84.8	76.4	72.9	7292	83.2
1990	4871.2	910	64.3	82.9	62.8	81.8	61.1	71.2	5673	64.8
1991	6372.3	910	84.6	83.1	84.0	82.0	79.9	72.3	7448	85.0
1992	5967.9	910	83.0	83.1	81.8	82.0	74.7	72.6	7220	82.2
1993	6285.3	910	87.7	83.5	79.8	81.8	78.8	73.2	7728	88.2
1994	4212.8	910	57.8	81.2	57.7	79.6	52.8	71.4	4979	56.8
1995	6739.6	910	85.9	81.6	85.4	80.1	84.5	72.4	7525	85.9
1996	6924.1	910	87.1	82.0	86.8	80.6	86.6	73.5	7744	88.2
1997	6614.1	910	86.4	82.3	86.4	81.0	83.0	74.2	7659	87.4
1998	6970.2	910	90.1	82.8	87.8	81.5	87.4	75.1	7954	90.8
1999	5123.0	910	66.8	81.9	64.2	80.4	64.3	74.4	5861	66.9
2000	6183.6	910	80.3	81.8	78.2	80.3	77.4	74.6	7143	81.3
2001	6707.1	910	85.4	82.0	84.2	80.5	84.1	75.1	7540	86.1
2002	6882.0	910	87.5	82.2	86.4	80.8	86.3	75.7	7682	87.7
2003	5844.9	910	86.5	82.5	73.6	80.4	73.3	75.6	6725	76.8
2004	5822.8	910	75.2	82.1	72.5	80.1	72.8	75.4	6699	76.3
2005	5868.1	910	80.3	82.0	76.4	79.9	73.6	75.4	6875	78.5
2006	6515.7	910	82.8	82.1	81.5	80.0	81.7	75.6	7340	83.8
2007	7441.7	910	90.9	82.4	90.9	80.4	93.4	76.4	8035	91.7
2008	7138.3	910	87.0	82.6	86.8	80.7	89.3	76.9	7676	87.4
2009	6134.5	910	87.1	82.8	75.8	80.5	77.0	76.9	6949	79.3
2010	6679.7	910	83.1	82.8	82.2	80.6	83.8	77.1	7390	84.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		267			261	
B. Refuelling without a maintenance				22	0	
C. Inspection, maintenance or repair combined with refuelling	1068			935	6	
D. Inspection, maintenance or repair without refuelling				25		
E. Testing of plant systems or components				5	0	
H. Nuclear regulatory requirements					28	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					50	13
L. Human factor related					1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						38
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						9
Z. Others		31			9	
Subtotal	1068	298	0	987	355	60
Total		1366			1402	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		13
12. Reactor I&C Systems	77	12
13. Reactor Auxiliary Systems		35
14. Safety Systems	17	5
15. Reactor Cooling Systems		11
16. Steam generation systems		58
31. Turbine and auxiliaries		7
32. Feedwater and Main Steam System	32	8
33. Circulating Water System		0
41. Main Generator Systems	24	39
42. Electrical Power Supply Systems	117	13
XX. Miscellaneous Systems		3
Total	267	204

FR-35 BLAYAIS-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
 Design Net Capacity: 910.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6723.7 GW(e).h
 Energy Availability Factor: 85.5%
 Load Factor: 84.3%
 Operating Factor: 88.1%
 Energy Unavailability Factor: 14.5%
 Total Off-line Time: 1042 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	673.1	608.6	668.9	640.2	441.3	35.9	648.1	637.7	590.2	550.3	558.7	670.6	6723.7
EAF (%)	99.4	99.5	99.5	99.1	66.7	5.5	95.8	98.0	92.7	82.5	86.7	99.9	85.5
UCF (%)	99.4	99.5	99.5	99.1	66.7	8.9	97.6	99.2	98.8	83.2	86.7	99.9	86.6
LF (%)	99.4	99.5	98.9	97.7	65.2	5.5	95.7	94.2	90.1	81.2	85.3	99.0	84.3
OF (%)	100.0	100.0	100.0	100.0	67.9	8.9	100.0	100.0	100.0	91.3	88.6	100.0	88.1
EUf (%)	0.6	0.5	0.5	0.9	33.3	94.5	4.2	2.0	7.3	17.5	13.3	0.1	14.5
PUF (%)	0.0	0.1	0.0	0.1	32.3	65.1	2.2	0.0	0.0	0.1	0.0	0.0	8.3
UCLF (%)	0.6	0.3	0.5	0.8	1.0	26.0	0.1	0.8	1.2	16.6	13.3	0.1	5.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	3.3	1.8	1.2	6.1	0.7	0.0	0.0	1.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 04 Jan 1978
 Date of First Criticality: 05 Jan 1983
 Date of Grid Connection: 16/05/1983
 Date of Commercial Operation: 10 Jan 1983

Lifetime Generation: 164679.4 GW(e).h
 Cumulative Energy Availability Factor: 79.6%
 Cumulative Load Factor: 75.1%
 Cumulative Unit Capability Factor: 82.1%
 Cumulative Energy Unavailability Factor: 20.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	1898.0	910	93.5	93.5	93.5	93.5	94.5	94.5	2092	94.7
1984	6012.0	910	76.0	79.5	76.0	79.5	75.2	79.1	6780	77.2
1985	5972.6	910	78.8	79.2	78.7	79.2	74.9	77.2	7024	80.2
1986	6278.1	910	82.5	80.2	81.9	80.0	78.8	77.7	7412	84.6
1987	6104.6	910	85.6	81.5	83.9	80.9	76.6	77.4	7437	84.9
1988	4337.0	910	71.5	79.6	70.2	78.9	54.3	73.0	5662	64.5
1989	5816.3	910	89.4	81.1	87.5	80.2	73.0	73.0	7250	82.8
1990	5912.3	910	83.4	81.5	78.2	80.0	74.2	73.2	7347	83.9
1991	5467.7	910	73.5	80.5	73.1	79.1	68.6	72.6	6496	74.2
1992	6120.6	910	84.1	80.9	83.5	79.6	76.6	73.0	7430	84.6
1993	5096.4	910	85.3	81.3	72.9	78.9	63.9	72.2	6854	78.2
1994	5897.1	910	82.6	81.4	81.8	79.2	74.0	72.3	7308	83.4
1995	5342.4	910	75.2	80.9	71.5	78.6	67.0	71.9	6198	70.8
1996	6719.6	910	88.2	81.5	86.9	79.2	84.1	72.8	7761	88.4
1997	6497.2	910	89.1	82.0	86.6	79.7	81.5	73.4	7705	88.0
1998	6692.6	910	90.3	82.6	87.9	80.3	84.0	74.1	7930	90.5
1999	6161.2	910	83.3	82.6	80.2	80.3	77.3	74.3	7369	84.1
2000	5467.5	910	75.1	82.2	72.5	79.8	68.4	74.0	6559	74.7
2001	6370.0	910	82.4	82.2	82.1	79.9	79.9	74.3	7297	83.3
2002	6462.2	910	86.2	82.4	85.1	80.2	81.1	74.6	7623	87.0
2003	5311.1	910	72.9	81.9	68.4	79.6	66.6	74.2	6292	71.8
2004	6560.3	910	88.3	82.2	84.6	79.9	82.1	74.6	7749	88.2
2005	5454.7	910	71.5	81.7	69.6	79.4	68.4	74.3	6357	72.6
2006	6758.4	910	88.5	82.0	86.5	79.7	84.8	74.8	7827	89.3
2007	6607.8	910	84.7	82.1	84.2	79.9	82.9	75.1	7484	85.4
2008	6755.7	910	87.4	82.3	87.0	80.2	84.5	75.5	7760	88.3
2009	4574.3	910	70.8	81.9	58.3	79.3	57.4	74.8	5295	60.4
2010	6723.7	910	86.6	82.1	85.5	79.6	84.3	75.1	7718	88.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		159			320	
B. Refuelling without a maintenance	685			22	1	
C. Inspection, maintenance or repair combined with refuelling				955	31	
D. Inspection, maintenance or repair without refuelling				7	0	
E. Testing of plant systems or components				1	0	
G. Major back-fitting, refurbishment or upgrading activities without refuelling						2
H. Nuclear regulatory requirements					9	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	20
L. Human factor related					3	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						24
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			24			17
Z. Others		176			16	0
Subtotal	685	335	24	985	391	63
Total		1044			1439	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		52
13. Reactor Auxiliary Systems		12
14. Safety Systems		41
15. Reactor Cooling Systems		8
16. Steam generation systems		21
31. Turbine and auxiliaries	18	46
32. Feedwater and Main Steam System		7
33. Circulating Water System		9
41. Main Generator Systems		45
42. Electrical Power Supply Systems	141	19
XX. Miscellaneous Systems		0
Total	159	262

FR-13 BUGEY-2

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF)
 at the beginning of 2010: 910.0 MW(e)
 Design Net Capacity: 920.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2218.1 GW(e).h
 Energy Availability Factor: 27.9%
 Load Factor: 27.8%
 Operating Factor: 31.2%
 Energy Unavailability Factor: 72.1%
 Total Off-line Time: 6028 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	633.7	475.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	444.0	665.0	2218.1
EAF (%)	93.8	77.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.8	99.2	27.9
UCF (%)	98.8	92.5	0.0	0.0	0.0	0.0	0.0	0.0	8.3	13.4	75.5	99.2	31.9
LF (%)	93.6	77.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67.8	98.2	27.8
OF (%)	100.0	93.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86.7	99.2	31.2
EUf (%)	6.2	22.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	32.2	0.8	72.1
PUF (%)	0.0	7.5	100.0	100.0	100.0	100.0	100.0	100.0	50.2	0.0	8.0	0.0	55.8
UCLF (%)	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.4	86.6	16.4	0.8	12.3
XUF (%)	5.0	14.7	0.0	0.0	0.0	0.0	0.0	0.0	8.3	13.4	7.7	0.0	4.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 11 Jan 1972
 Date of First Criticality: 20/04/1978
 Date of Grid Connection: 05 Oct 1978
 Date of Commercial Operation: 03 Jan 1979

Lifetime Generation: 171994.7 GW(e).h
 Cumulative Energy Availability Factor: 71.6%
 Cumulative Load Factor: 66.9%
 Cumulative Unit Capability Factor: 73.7%
 Cumulative Energy Unavailability Factor: 28.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	3535.0	925	53.2	53.2	53.2	53.2	52.0	52.0	4442	60.5
1980	4460.0	920	55.7	54.5	55.7	54.5	55.2	53.7	5271	60.0
1981	5209.6	920	65.2	58.3	65.2	58.3	64.6	57.6	6017	68.7
1982	3341.7	920	41.6	53.9	41.6	53.9	41.5	53.4	3863	44.1
1983	6725.0	920	85.3	60.4	85.3	60.4	83.4	59.6	7689	87.8
1984	5748.0	920	87.9	65.1	87.9	65.1	71.1	61.6	6580	74.9
1985	5948.8	920	79.7	67.3	76.0	66.7	73.8	63.4	7118	81.3
1986	5945.6	920	86.4	69.7	84.5	69.0	73.8	64.7	7515	85.8
1987	3581.1	920	53.4	67.9	51.6	67.0	44.4	62.4	4729	54.0
1988	4495.0	920	67.0	67.8	63.1	66.6	55.6	61.7	5718	65.1
1989	4700.8	920	64.7	67.5	61.1	66.1	58.3	61.4	5721	65.3
1990	4878.7	920	69.7	67.7	69.3	66.4	60.5	61.3	6213	70.9
1991	4927.2	920	66.7	67.6	64.4	66.2	61.1	61.3	6001	68.5
1992	3918.3	910	53.9	66.6	50.2	65.1	49.0	60.4	4781	54.4
1993	4509.9	910	99.2	68.8	94.2	67.0	56.6	60.2	5718	65.3
1994	5782.2	910	77.7	69.3	76.5	67.6	72.5	60.9	6811	77.8
1995	6045.7	910	79.6	70.0	78.1	68.2	75.8	61.8	7051	80.5
1996	5533.9	910	78.7	70.4	75.4	68.6	69.2	62.2	6863	78.1
1997	5477.7	910	84.4	71.2	81.0	69.3	68.7	62.6	6815	77.8
1998	5379.4	910	77.6	71.5	72.9	69.5	67.5	62.8	6605	75.4
1999	5960.3	910	78.9	71.9	77.5	69.9	74.8	63.4	7050	80.5
2000	5183.5	910	68.5	71.7	66.3	69.7	64.8	63.5	6025	68.6
2001	5685.9	910	72.3	71.7	72.2	69.8	71.3	63.8	6493	74.1
2002	5542.3	910	70.2	71.7	69.9	69.8	69.5	64.0	6212	70.9
2003	5521.7	910	74.8	71.8	71.0	69.9	69.3	64.2	6579	75.1
2004	7593.4	910	97.1	72.8	96.0	70.9	95.0	65.4	8571	97.6
2005	6373.9	910	86.7	73.3	81.7	71.3	80.0	66.0	7607	86.8
2006	6125.7	910	80.9	73.6	79.2	71.5	76.9	66.4	7158	81.7
2007	6925.1	910	88.7	74.1	87.6	72.1	86.9	67.1	7880	89.9
2008	6130.8	910	78.9	74.2	77.7	72.3	76.7	67.4	7517	85.6
2009	7285.3	910	99.0	75.0	96.1	73.1	91.4	68.2	8731	99.7
2010	2218.1	910	31.9	73.7	27.9	71.6	27.8	66.9	2732	31.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		5			522	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	4823			1148	41	
D. Inspection, maintenance or repair without refuelling				117		
E. Testing of plant systems or components				11	0	
H. Nuclear regulatory requirements				41	0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	51	14
L. Human factor related					12	0
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			160			
Z. Others		1039			10	
Subtotal	4823	1044	160	1319	637	14
Total		6027			1970	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		167
12. Reactor I&C Systems		20
13. Reactor Auxiliary Systems		10
14. Safety Systems		65
15. Reactor Cooling Systems		33
16. Steam generation systems		16
21. Fuel Handling and Storage Facilities		60
31. Turbine and auxiliaries		24
32. Feedwater and Main Steam System		25
33. Circulating Water System		1
35. All other I&C Systems		0
41. Main Generator Systems		68
42. Electrical Power Supply Systems		4
XX. Miscellaneous Systems	5	0
Total	5	493

2010 Operating Experience

FR-14 BUGEY-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 920.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	100.0	12.9
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUf (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	100.0	100.0	46.7	0.0	28.8
UCLF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	0.0	0.0	0.0	0.0	58.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.3	100.0	12.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 09 Jan 1973
Date of First Criticality: 31/08/1978
Date of Grid Connection: 21/09/1978
Date of Commercial Operation: 03 Jan 1979
Lifetime Generation: 164371.7 GW(e).h
Cumulative Energy Availability Factor: 69.5%
Cumulative Load Factor: 64.2%
Cumulative Unit Capability Factor: 72.0%
Cumulative Energy Unavailability Factor: 30.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	2744.0	925	39.9	39.9	39.9	39.9	40.4	40.4	3308	45.0
1980	5960.0	920	74.7	58.8	74.7	58.8	73.8	58.5	6951	79.1
1981	4849.6	920	61.0	59.6	61.0	59.6	60.2	59.1	5646	64.5
1982	6002.2	920	78.9	64.6	78.9	64.6	74.5	63.1	7661	87.5
1983	5525.0	920	74.0	66.5	74.0	66.5	68.6	64.2	6556	74.8
1984	5793.0	920	78.0	68.5	78.0	68.5	71.7	65.5	6905	78.6
1985	4571.1	920	58.7	67.1	57.2	66.8	56.7	64.2	5235	59.8
1986	6558.1	920	87.7	69.7	87.1	69.4	81.4	66.4	7634	87.1
1987	5482.5	920	78.4	70.7	76.4	70.2	68.0	66.6	6637	75.8
1988	3812.0	920	64.7	70.1	62.4	69.4	47.2	64.6	4935	56.2
1989	4914.3	920	88.7	71.8	87.4	71.1	61.0	64.3	6467	73.8
1990	4538.6	920	68.0	71.5	62.9	70.4	56.3	63.6	5474	62.5
1991	3442.8	920	55.7	70.2	51.7	68.9	42.7	62.0	4168	47.6
1992	2490.0	910	32.5	67.5	32.2	66.3	31.2	59.8	2879	32.8
1993	5954.4	910	80.2	68.4	76.1	67.0	74.7	60.8	7117	81.2
1994	4717.7	910	70.0	68.5	65.2	66.9	59.2	60.7	5872	67.0
1995	5535.7	910	95.9	70.1	95.2	68.5	69.4	61.2	6564	74.9
1996	5652.9	910	78.7	70.6	76.4	69.0	70.7	61.7	7012	79.8
1997	5596.6	910	75.0	70.8	74.9	69.3	70.2	62.2	6561	74.9
1998	6680.4	910	89.1	71.7	89.0	70.3	83.8	63.2	7875	89.9
1999	5786.6	910	77.6	72.0	77.3	70.6	72.6	63.7	7001	79.9
2000	5745.1	910	75.7	72.2	74.7	70.8	71.9	64.1	6765	77.0
2001	6230.6	910	81.8	72.6	81.2	71.2	78.2	64.7	7129	81.4
2002	4634.7	880	65.3	72.3	62.7	70.9	60.1	64.5	5654	64.5
2003	6646.1	910	97.2	73.3	85.2	71.5	83.4	65.2	7924	90.5
2004	6447.3	910	88.2	73.9	87.9	72.1	80.7	65.8	7461	84.9
2005	5805.4	910	82.3	74.2	76.8	72.3	72.8	66.1	7017	80.1
2006	6563.5	910	89.1	74.7	83.9	72.7	82.3	66.7	7624	87.0
2007	7277.8	910	93.4	75.4	91.4	73.3	91.3	67.5	8258	94.3
2008	5807.1	910	73.5	75.3	72.9	73.3	72.6	67.7	7352	83.7
2009	1984.8	910	31.0	73.9	25.0	71.8	24.9	66.3	2676	30.5
2010	0.0	910	12.9	72.0	0.0	69.5	0.0	64.2	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		5111			648	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	2521			997	40	
D. Inspection, maintenance or repair without refuelling				72		
E. Testing of plant systems or components				45	0	
H. Nuclear regulatory requirements					0	3
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					61	56
L. Human factor related					6	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						18
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			1128			16
Z. Others					2	
Subtotal	2521	5111	1128	1114	760	93
Total		8760			1967	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		201
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		14
14. Safety Systems		20
15. Reactor Cooling Systems		40
16. Steam generation systems	5111	169
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		43
32. Feedwater and Main Steam System		26
33. Circulating Water System		1
41. Main Generator Systems		98
42. Electrical Power Supply Systems		15
XX. Miscellaneous Systems		3
Total	5111	637

2010 Operating Experience

FR-15 BUGEY-4

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 880.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7374.1 GW(e).h
Energy Availability Factor: 98.4%
Load Factor: 95.7%
Operating Factor: 99.0%
Energy Unavailability Factor: 1.6%
Total Off-line Time: 86 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	622.0	571.9	650.5	630.9	596.6	598.5	590.2	611.2	591.7	629.0	624.5	657.2	7374.1
EAF (%)	96.6	100.0	99.9	99.8	93.7	100.0	93.2	98.7	98.7	100.0	100.0	100.0	98.4
UCF (%)	96.6	100.0	99.9	99.9	98.5	100.0	93.2	99.6	100.0	100.0	100.0	100.0	99.0
LF (%)	95.0	96.7	99.5	99.6	91.1	94.5	90.1	93.4	93.4	95.9	98.6	100.4	95.7
OF (%)	97.0	100.0	100.0	100.0	95.4	100.0	96.6	99.3	100.0	100.0	100.0	100.0	99.0
EUf (%)	3.4	0.0	0.1	0.2	6.3	0.0	6.8	1.3	1.3	0.0	0.0	0.0	1.6
PUF (%)	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	3.2	0.0	0.1	0.1	1.5	0.0	6.8	0.4	0.0	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.9	1.3	0.0	0.0	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 06 Jan 1974
Date of First Criticality: 17/02/1979
Date of Grid Connection: 03 Aug 1979
Date of Commercial Operation: 07 Jan 1979
Lifetime Generation: 168159.9 GW(e).h
Cumulative Energy Availability Factor: 73.6%
Cumulative Load Factor: 68.3%
Cumulative Unit Capability Factor: 75.9%
Cumulative Energy Unavailability Factor: 26.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	2323.0	900	64.6	64.6	64.6	64.6	58.4	58.4	2854	64.6
1980	5063.0	900	65.8	65.4	65.8	65.4	64.0	62.2	5983	68.1
1981	5671.9	900	75.6	69.5	75.6	69.5	71.9	66.1	6834	78.0
1982	5474.9	900	69.8	69.6	69.8	69.6	69.4	67.0	6276	71.6
1983	6329.0	900	83.3	72.6	83.2	72.6	80.3	70.0	7389	84.3
1984	5882.0	900	75.8	73.2	75.8	73.2	74.4	70.8	6896	78.5
1985	6224.4	900	87.2	75.3	86.7	75.3	78.9	72.0	7696	87.9
1986	5312.7	900	78.7	75.8	76.1	75.4	67.4	71.4	6622	75.6
1987	4670.9	900	79.8	76.3	78.2	75.7	59.2	70.0	6180	70.5
1988	3323.0	900	67.3	75.3	51.5	73.1	42.0	67.0	4524	51.5
1989	5541.3	900	76.7	75.5	76.2	73.4	70.3	67.3	6846	78.2
1990	3186.6	880	56.7	73.9	53.5	71.7	41.3	65.1	4312	49.2
1991	4984.9	880	71.8	73.7	69.3	71.6	64.7	65.1	6317	72.1
1992	1649.1	880	22.2	69.9	22.2	68.0	21.3	61.9	2012	22.9
1993	5748.6	880	82.2	70.8	74.2	68.4	74.6	62.8	7506	85.7
1994	5209.3	880	83.5	71.6	82.2	69.3	67.6	63.1	6619	75.6
1995	3989.9	880	64.3	71.1	59.1	68.7	51.8	62.4	4843	55.3
1996	4188.1	880	62.6	70.7	62.4	68.3	54.2	61.9	5333	60.7
1997	5652.5	880	83.6	71.3	80.7	69.0	73.3	62.5	7420	84.7
1998	6304.0	880	88.3	72.2	86.3	69.8	81.8	63.5	7791	88.9
1999	5591.3	880	81.5	72.7	77.5	70.2	72.5	63.9	7231	82.5
2000	5988.0	880	85.1	73.2	82.6	70.8	77.5	64.6	7544	85.9
2001	4746.0	880	65.8	72.9	63.4	70.5	61.6	64.4	5921	67.6
2002	5590.8	880	83.5	73.3	83.4	71.0	72.5	64.8	7130	81.4
2003	6645.3	880	95.6	74.2	94.2	71.9	86.2	65.6	8192	93.5
2004	6098.3	880	83.0	74.6	81.3	72.3	78.9	66.2	7367	83.9
2005	6073.2	880	84.0	74.9	80.3	72.6	78.8	66.6	7672	87.6
2006	6846.7	880	94.6	75.6	93.1	73.3	88.8	67.4	8341	95.2
2007	3586.2	880	47.2	74.7	46.8	72.4	46.5	66.7	4217	48.1
2008	6790.4	880	88.5	75.1	87.7	72.9	87.8	67.4	7891	89.8
2009	5094.3	880	75.2	75.1	67.5	72.8	66.1	67.4	6262	71.5
2010	7374.1	880	99.0	75.9	98.4	73.6	95.7	68.3	8674	99.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		46			587	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling				1125	20	
D. Inspection, maintenance or repair without refuelling				98		
E. Testing of plant systems or components				11	0	
H. Nuclear regulatory requirements					6	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					8	29
L. Human factor related					5	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			33			19
Z. Others					12	
Subtotal	0	46	33	1234	645	49
Total		79			1928	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		256
12. Reactor I&C Systems		20
13. Reactor Auxiliary Systems		3
14. Safety Systems		16
15. Reactor Cooling Systems		23
16. Steam generation systems		59
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries	23	32
32. Feedwater and Main Steam System		11
33. Circulating Water System		3
35. All other I&C Systems	23	4
41. Main Generator Systems		35
42. Electrical Power Supply Systems		117
XX. Miscellaneous Systems		0
Total	46	581

2010 Operating Experience

FR-16 BUGEY-5

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 880.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5927.5 GW(e).h
Energy Availability Factor: 80.1%
Load Factor: 76.9%
Operating Factor: 85.1%
Energy Unavailability Factor: 19.9%
Total Off-line Time: 1303 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	277.1	579.8	609.1	621.4	507.2	621.5	529.4	446.5	477.3	606.1	652.2	5927.5
EAF (%)	0.0	47.1	89.7	99.1	98.2	89.3	99.9	84.1	75.3	77.8	99.2	100.0	80.1
UCF (%)	33.3	58.8	89.7	99.1	98.5	90.0	100.0	99.5	99.4	100.0	99.2	100.0	89.1
LF (%)	0.0	46.9	88.7	96.1	94.9	80.0	94.9	80.9	70.5	72.8	95.7	99.6	76.9
OF (%)	0.0	61.0	95.2	100.0	100.0	92.6	100.0	100.0	78.1	93.3	100.0	100.0	85.1
EUUF (%)	100.0	52.9	10.3	0.9	1.8	10.7	0.1	15.9	24.7	22.2	0.8	0.0	19.9
PUF (%)	66.7	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
UCLF (%)	0.0	29.9	10.2	0.9	1.5	10.0	0.1	0.5	0.6	0.0	0.8	0.0	4.3
XUF (%)	33.3	11.7	0.0	0.0	0.3	0.7	0.0	15.4	24.1	22.1	0.0	0.0	9.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 07 Jan 1974
Date of First Criticality: 15/07/1979
Date of Grid Connection: 31/07/1979
Date of Commercial Operation: 01 Mar 1980
Lifetime Generation: 170779.9 GW(e).h
Cumulative Energy Availability Factor: 76.1%
Cumulative Load Factor: 70.4%
Cumulative Unit Capability Factor: 78.7%
Cumulative Energy Unavailability Factor: 23.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	6589.0	900	84.5	84.5	84.5	84.5	83.3	83.3	8050	91.6
1981	4869.3	900	62.7	73.6	62.7	73.6	61.8	72.6	6061	69.2
1982	5738.5	900	76.4	74.5	76.4	74.5	72.8	72.6	6956	79.4
1983	5578.0	900	73.9	74.4	73.9	74.4	70.8	72.2	6649	75.9
1984	5778.0	900	74.1	74.3	74.1	74.3	73.1	72.4	6884	78.4
1985	6079.7	900	84.6	76.0	80.5	75.4	77.1	73.1	7314	83.5
1986	5465.5	900	75.7	76.0	75.5	75.4	69.3	72.6	6493	74.1
1987	5015.9	900	67.8	75.0	66.6	74.3	63.6	71.5	6044	69.0
1988	5466.0	900	89.7	76.6	84.6	75.4	69.1	71.2	6465	73.6
1989	4758.0	900	68.8	75.8	64.7	74.4	60.3	70.1	6185	70.6
1990	5586.0	880	80.7	76.3	74.9	74.4	72.5	70.3	7156	81.7
1991	3358.4	880	47.9	73.9	44.0	71.9	43.6	68.2	4258	48.6
1992	4035.0	880	56.4	72.6	52.5	70.5	52.2	66.9	5003	57.0
1993	4416.6	880	60.5	71.8	57.4	69.5	57.3	66.3	5329	60.8
1994	4487.3	880	85.9	72.7	85.7	70.6	58.2	65.7	6311	72.0
1995	5582.8	880	79.9	73.1	78.0	71.1	72.4	66.1	7060	80.6
1996	5361.4	880	79.0	73.5	77.5	71.4	69.4	66.3	6844	77.9
1997	5592.9	880	88.0	74.3	84.3	72.1	72.6	66.7	7302	83.4
1998	5320.4	880	83.9	74.8	80.5	72.6	69.0	66.8	6844	78.1
1999	6108.8	880	86.8	75.4	82.7	73.1	79.2	67.4	7679	87.7
2000	5403.2	880	77.3	75.5	74.6	73.1	69.9	67.5	6889	78.4
2001	4358.6	880	77.9	75.6	72.1	73.1	56.5	67.0	5604	64.0
2002	6146.9	900	91.2	76.3	91.2	73.9	78.0	67.5	7925	90.5
2003	5711.1	880	83.5	76.6	80.0	74.1	74.1	67.8	7220	82.4
2004	5256.1	880	72.7	76.4	71.4	74.0	68.0	67.8	6438	73.3
2005	7022.8	880	98.9	77.3	97.5	74.9	91.1	68.7	8573	97.9
2006	6118.1	880	88.5	77.7	86.6	75.4	79.4	69.1	7765	88.6
2007	5752.9	880	77.4	77.7	75.1	75.3	74.6	69.3	7051	80.5
2008	6302.5	880	87.0	78.0	84.3	75.7	81.5	69.7	7822	89.0
2009	6556.8	880	89.8	78.4	86.6	76.0	85.1	70.2	7935	90.6
2010	5927.5	880	89.1	78.7	80.1	76.1	76.9	70.4	7457	85.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		92			332	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	496			1225	11	
D. Inspection, maintenance or repair without refuelling				21		
E. Testing of plant systems or components	3			10	2	
H. Nuclear regulatory requirements					1	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					48	35
L. Human factor related		37			11	0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
P. Fire						5
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			327			0
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)			176			
Z. Others		151	55		10	
Subtotal	499	280	558	1256	418	41
Total		1337			1715	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		23
12. Reactor I&C Systems		47
13. Reactor Auxiliary Systems		8
14. Safety Systems		3
15. Reactor Cooling Systems		27
16. Steam generation systems		138
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	48	38
32. Feedwater and Main Steam System	7	7
33. Circulating Water System	8	2
41. Main Generator Systems		15
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems	29	2
Total	92	318

FR-50 CATTENOM-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1300.0 MW(e)
Design Net Capacity: 1300.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9864.1 GW(e).h
Energy Availability Factor: 87.6%
Load Factor: 86.6%
Operating Factor: 90.7%
Energy Unavailability Factor: 12.4%
Total Off-line Time: 812 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	957.9	868.2	836.6	919.7	938.5	894.6	913.8	927.2	90.3	710.3	857.6	949.5	9864.1
EAF (%)	99.5	99.4	86.7	98.6	97.6	96.7	95.3	96.2	9.7	76.4	95.7	99.5	87.6
UCF (%)	99.9	100.0	87.3	99.8	99.4	99.7	99.4	99.4	13.3	78.9	96.0	99.7	89.4
LF (%)	99.0	99.4	86.6	98.3	97.0	95.6	94.5	95.9	9.6	73.3	91.6	98.2	86.6
OF (%)	100.0	100.0	95.3	100.0	100.0	100.0	100.0	100.0	10.3	82.4	100.0	100.0	90.7
EUf (%)	0.5	0.6	13.3	1.4	2.4	3.3	4.7	3.8	90.3	23.6	4.3	0.5	12.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.6	5.7	0.0	0.0	7.4
UCLF (%)	0.1	0.0	12.7	0.2	0.6	0.3	0.6	0.6	3.1	15.4	4.0	0.3	3.2
XUF (%)	0.4	0.6	0.6	1.3	1.8	3.0	4.1	3.1	3.6	2.5	0.2	0.2	1.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 29/10/1979
Date of First Criticality: 24/10/1986
Date of Grid Connection: 13/11/1986
Date of Commercial Operation: 04 Jan 1987

Lifetime Generation: 189499.8 GW(e).h
Cumulative Energy Availability Factor: 73.4%
Cumulative Load Factor: 69.4%
Cumulative Unit Capability Factor: 74.9%
Cumulative Energy Unavailability Factor: 26.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	5472.0	1265	69.5	69.5	68.8	68.8	65.5	65.5	4514	68.4
1988	5283.0	1300	47.8	57.0	47.4	56.4	46.3	54.4	4369	49.7
1989	6802.4	1300	60.3	58.2	60.3	57.8	59.7	56.4	5548	63.3
1990	7781.9	1300	75.7	62.9	75.3	62.5	68.3	59.6	6710	76.6
1991	1509.3	1300	13.5	52.4	13.5	52.2	13.3	49.8	1336	15.3
1992	7933.3	1300	71.5	55.8	71.0	55.5	69.5	53.2	6595	75.1
1993	6956.6	1300	63.5	56.9	61.5	56.3	61.1	54.4	5608	64.0
1994	6775.4	1300	64.1	57.8	64.0	57.3	59.5	55.0	6006	68.6
1995	6634.3	1300	59.8	58.1	59.5	57.6	58.3	55.4	6346	72.4
1996	9539.2	1300	87.5	61.1	87.3	60.6	83.5	58.3	7783	88.6
1997	8688.9	1300	84.1	63.2	81.4	62.6	76.3	60.0	7374	84.2
1998	9365.8	1300	85.9	65.2	85.7	64.5	82.2	61.9	7644	87.3
1999	8273.0	1300	79.8	66.3	76.3	65.5	72.6	62.7	7028	80.2
2000	8053.8	1300	81.0	67.4	78.1	66.4	70.5	63.3	6873	78.2
2001	9220.2	1300	96.4	69.3	96.4	68.4	81.0	64.5	8094	92.4
2002	8270.2	1300	79.4	70.0	79.2	69.1	72.6	65.0	7011	80.0
2003	8531.0	1300	80.4	70.6	78.4	69.7	74.9	65.6	7150	81.6
2004	9764.2	1300	96.9	72.1	96.4	71.2	85.5	66.7	8583	97.7
2005	9323.8	1300	89.1	73.0	83.2	71.8	81.9	67.5	7919	90.4
2006	7449.0	1300	71.5	72.9	68.6	71.7	65.4	67.4	6480	74.0
2007	9696.2	1300	94.0	73.9	92.4	72.7	85.1	68.3	8426	96.2
2008	9022.9	1300	82.2	74.3	79.2	73.0	79.0	68.8	7881	89.7
2009	7612.7	1300	73.1	74.3	68.4	72.8	66.8	68.7	6261	71.5
2010	9864.1	1300	89.4	74.9	87.6	73.4	86.6	69.4	7948	90.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		108			757	
B. Refuelling without a maintenance	600			28	4	
C. Inspection, maintenance or repair combined with refuelling				895	14	
D. Inspection, maintenance or repair without refuelling				43	7	
E. Testing of plant systems or components				60		
H. Nuclear regulatory requirements					8	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					59	
L. Human factor related					4	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			42			14
Z. Others		64			0	
Subtotal	600	172	42	1026	853	15
Total		814			1894	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		19
12. Reactor I&C Systems	48	35
13. Reactor Auxiliary Systems		32
14. Safety Systems		9
15. Reactor Cooling Systems		82
16. Steam generation systems	60	38
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		37
32. Feedwater and Main Steam System		82
33. Circulating Water System		24
41. Main Generator Systems		342
42. Electrical Power Supply Systems		14
XX. Miscellaneous Systems		12
Total	108	731

FR-53 CATTENOM-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1300.0 MW(e)
Design Net Capacity: 1300.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8866.2 GW(e).h
Energy Availability Factor: 89.4%
Load Factor: 77.9%
Operating Factor: 91.3%
Energy Unavailability Factor: 10.6%
Total Off-line Time: 759 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	889.6	738.3	727.9	693.8	762.8	674.4	732.2	506.6	880.7	844.8	550.7	864.5	8866.2
EAF (%)	98.3	98.7	91.8	87.1	95.4	95.4	96.5	55.6	96.7	99.1	67.3	91.5	89.4
UCF (%)	98.5	98.8	92.1	87.4	99.8	99.7	99.9	98.8	98.3	99.8	71.1	91.5	94.7
LF (%)	92.0	84.5	75.4	74.1	78.9	72.1	75.7	52.4	94.1	87.2	58.8	89.4	77.9
OF (%)	100.0	100.0	93.4	94.3	95.7	96.0	97.2	59.4	100.0	100.0	68.3	92.3	91.3
EUf (%)	1.7	1.3	8.2	12.9	4.6	4.6	3.5	44.4	3.3	0.9	32.7	8.5	10.6
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0
UCLF (%)	1.5	1.2	7.9	12.6	0.2	0.3	0.2	1.2	1.7	0.2	28.6	8.5	5.3
XUF (%)	0.1	0.1	0.2	0.2	4.4	4.4	3.4	43.2	1.6	0.7	3.8	0.0	5.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 28/07/1980
Date of First Criticality: 08 Jul 1987
Date of Grid Connection: 17/09/1987
Date of Commercial Operation: 02 Jan 1988

Lifetime Generation: 193053.3 GW(e).h
Cumulative Energy Availability Factor: 78.7%
Cumulative Load Factor: 73.2%
Cumulative Unit Capability Factor: 80.9%
Cumulative Energy Unavailability Factor: 21.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	7457.0	1300	91.0	91.0	90.8	90.8	71.3	71.3	6588	81.9
1989	1765.5	1300	16.5	52.2	15.5	51.5	15.5	42.2	1452	16.6
1990	8137.6	1300	83.0	62.7	82.7	62.2	71.5	52.2	6670	76.1
1991	7543.1	1300	71.7	65.0	68.2	63.7	66.2	55.8	6472	73.9
1992	8134.3	1300	75.6	67.2	72.4	65.5	71.2	59.0	6752	76.9
1993	8627.0	1300	78.8	69.2	76.2	67.3	75.8	61.8	6990	79.8
1994	8526.3	1300	80.5	70.8	77.7	68.8	74.9	63.7	7158	81.7
1995	8603.7	1300	79.9	71.9	78.3	70.0	75.6	65.2	7138	81.5
1996	9018.1	1300	99.6	75.1	98.1	73.2	79.0	66.7	7804	88.8
1997	8487.4	1300	84.4	76.0	82.2	74.1	74.5	67.5	7503	85.7
1998	7259.5	1300	69.0	75.3	68.0	73.5	63.7	67.2	6144	70.1
1999	9367.5	1300	90.2	76.6	87.3	74.7	82.3	68.4	7781	88.8
2000	9164.3	1300	88.6	77.5	88.6	75.7	80.3	69.4	7868	89.6
2001	8649.0	1300	79.4	77.7	77.5	75.9	75.9	69.8	7033	80.3
2002	8288.0	1300	76.9	77.6	76.9	75.9	72.8	70.0	6918	79.0
2003	10197.5	1300	99.3	79.0	93.5	77.0	89.5	71.3	8217	93.8
2004	7368.2	1300	68.7	78.4	66.8	76.4	64.5	70.9	6183	70.4
2005	9247.8	1300	87.9	78.9	84.7	76.9	81.2	71.4	7845	89.6
2006	9870.3	1300	98.0	79.9	96.1	77.9	86.7	72.2	8626	98.5
2007	9526.5	1300	87.8	80.3	85.7	78.3	83.7	72.8	7758	88.6
2008	7707.8	1300	71.7	79.9	69.5	77.9	67.5	72.6	6356	72.4
2009	9460.9	1300	88.1	80.3	85.1	78.2	83.1	73.0	7845	89.6
2010	8866.2	1300	94.7	80.9	89.4	78.7	77.9	73.2	8001	91.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		324			445	
B. Refuelling without a maintenance				30	9	
C. Inspection, maintenance or repair combined with refuelling				896	7	
D. Inspection, maintenance or repair without refuelling				50	19	
E. Testing of plant systems or components				50	0	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	21
L. Human factor related		25			3	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						0
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)			293			
Z. Others			138		24	
Subtotal	0	349	431	1026	517	22
Total		780			1565	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		9
14. Safety Systems		28
15. Reactor Cooling Systems		198
16. Steam generation systems		82
31. Turbine and auxiliaries	47	14
32. Feedwater and Main Steam System	17	15
33. Circulating Water System		1
35. All other I&C Systems		2
41. Main Generator Systems	258	11
42. Electrical Power Supply Systems		23
XX. Miscellaneous Systems	2	7
Total	324	407

FR-60 CATTENOM-3

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1300.0 MW(e)
 Design Net Capacity: 1300.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8756.8 GW(e).h
 Energy Availability Factor: 81.7%
 Load Factor: 76.9%
 Operating Factor: 79.5%
 Energy Unavailability Factor: 18.3%
 Total Off-line Time: 1794 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	970.7	871.7	950.4	934.0	172.2	0.0	332.5	884.5	869.3	896.8	915.1	959.5	8756.8
EAF (%)	99.8	99.6	98.2	99.5	17.8	8.9	69.6	99.2	96.4	94.1	98.6	99.7	81.7
UCF (%)	100.0	100.0	98.5	99.9	17.9	12.7	70.4	99.9	99.4	99.4	99.0	99.8	83.0
LF (%)	100.4	99.8	98.4	99.8	17.8	0.0	34.4	91.5	92.9	92.6	97.8	99.2	76.9
OF (%)	100.0	100.0	100.0	100.0	18.3	0.0	37.4	100.0	100.0	100.0	100.0	100.0	79.5
EUf (%)	0.2	0.4	1.8	0.5	82.2	91.1	30.4	0.8	3.6	5.9	1.4	0.3	18.3
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	1.5	0.1	82.1	87.3	29.5	0.1	0.6	0.6	0.9	0.3	17.0
XUF (%)	0.2	0.3	0.3	0.3	0.0	3.8	0.8	0.7	3.0	5.3	0.5	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 15/06/1982
 Date of First Criticality: 16/02/1990
 Date of Grid Connection: 07 Jun 1990
 Date of Commercial Operation: 02 Jan 1991

Lifetime Generation: 170526.0 GW(e).h
 Cumulative Energy Availability Factor: 79.6%
 Cumulative Load Factor: 74.2%
 Cumulative Unit Capability Factor: 81.6%
 Cumulative Energy Unavailability Factor: 20.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]	Cumul.	Factor [%]	Cumul.	Annual	Cumul.	Hours	OF [%]
1991	8931.1	1300	89.6	89.6	88.2	88.2	85.7	85.7	7255	90.5
1992	7145.0	1300	67.0	77.8	65.6	76.4	62.6	73.6	5903	67.2
1993	8035.1	1300	81.2	78.9	75.9	76.2	70.6	72.6	6858	78.3
1994	8613.3	1300	85.7	80.7	84.4	78.3	75.6	73.3	7464	85.2
1995	8344.3	1300	82.2	81.0	78.9	78.4	73.3	73.3	7269	83.0
1996	8264.7	1300	80.6	80.9	77.3	78.2	72.4	73.2	7184	81.8
1997	9504.1	1300	94.5	82.9	93.2	80.4	83.5	74.7	8097	92.4
1998	8054.9	1300	83.5	83.0	80.2	80.4	70.7	74.2	7175	81.9
1999	8237.0	1300	83.5	83.0	79.7	80.3	72.3	74.0	7169	81.8
2000	8933.5	1300	99.1	84.6	98.7	82.2	78.2	74.4	7984	90.9
2001	3171.5	1300	29.8	79.6	29.7	77.4	27.8	70.1	2739	31.3
2002	9402.5	1300	83.6	80.0	82.5	77.8	82.6	71.2	7443	85.0
2003	11254.0	1300	99.3	81.5	98.4	79.4	98.8	73.3	8715	99.5
2004	9162.7	1300	81.4	81.5	80.3	79.5	80.2	73.8	7274	82.8
2005	9757.0	1300	89.2	82.0	86.7	79.9	85.7	74.6	7944	90.7
2006	8045.3	1300	79.9	81.8	76.5	79.7	70.6	74.4	7088	80.9
2007	9500.6	1300	99.3	82.9	98.5	80.8	83.4	74.9	8559	97.7
2008	8712.7	1300	80.5	82.7	78.4	80.7	76.3	75.0	7145	81.3
2009	6649.8	1300	60.4	81.6	58.7	79.5	58.4	74.1	5277	60.2
2010	8756.8	1300	83.0	81.6	81.7	79.6	76.9	74.2	6966	79.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1444			311	3
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				886	18	
D. Inspection, maintenance or repair without refuelling				63		
E. Testing of plant systems or components				16		
H. Nuclear regulatory requirements					109	
J. Grid limitation, failure or grid unavailability			322			2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					31	9
L. Human factor related					5	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			28			6
Z. Others					6	
Subtotal	0	1444	350	965	480	20
Total		1794			1465	

7. Equipment Related Full Outages, Analysis by System

System	2010	1990 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		32
12. Reactor I&C Systems		38
13. Reactor Auxiliary Systems	19	51
14. Safety Systems		33
15. Reactor Cooling Systems		12
16. Steam generation systems		31
21. Fuel Handling and Storage Facilities		9
31. Turbine and auxiliaries		17
32. Feedwater and Main Steam System		10
41. Main Generator Systems	1301	53
42. Electrical Power Supply Systems		6
XX. Miscellaneous Systems	124	2
Total	1444	294

FR-65 CATTENOM-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1300.0 MW(e)
 Design Net Capacity: 1300.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7502.2 GW(e).h
 Energy Availability Factor: 70.4%
 Load Factor: 65.9%
 Operating Factor: 76.2%
 Energy Unavailability Factor: 29.6%
 Total Off-line Time: 2083 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	943.7	702.0	266.9	0.0	0.0	474.7	828.5	748.5	844.2	908.7	861.2	923.8	7502.2
EAF (%)	97.9	80.4	27.6	0.0	0.0	50.7	97.8	93.4	98.3	98.5	99.9	99.7	70.4
UCF (%)	99.2	100.0	38.7	0.0	0.0	51.7	98.6	93.6	98.7	99.8	99.9	99.7	73.2
LF (%)	97.6	80.4	27.6	0.0	0.0	50.7	85.7	77.4	90.2	93.8	92.0	95.5	65.9
OF (%)	100.0	100.0	39.0	0.0	0.0	76.9	100.0	100.0	100.0	100.0	100.0	100.0	76.2
EUf (%)	2.1	19.6	72.4	100.0	100.0	49.3	2.2	6.6	1.7	1.5	0.1	0.3	29.6
PUF (%)	0.0	0.0	61.3	100.0	61.6	12.9	0.0	0.1	0.0	0.0	0.0	0.0	19.7
UCLF (%)	0.8	0.0	0.0	0.0	38.4	35.5	1.4	6.3	1.3	0.2	0.1	0.3	7.0
XUF (%)	1.3	19.6	11.1	0.0	0.0	0.9	0.8	0.2	0.5	1.3	0.0	0.0	2.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 28/09/1983 Lifetime Generation: 171240.7 GW(e).h
 Date of First Criticality: 05 Apr 1991 Cumulative Energy Availability Factor: 83.9%
 Date of Grid Connection: 27/05/1991 Cumulative Load Factor: 78.1%
 Date of Commercial Operation: 01 Jan 1992 Cumulative Unit Capability Factor: 85.6%
 Cumulative Energy Unavailability Factor: 16.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1992	9356.0	1300	88.0	88.0	85.8	85.8	81.9	81.9	7649	87.1
1993	7736.4	1300	79.1	83.6	78.0	81.9	67.9	74.9	6251	71.4
1994	7828.8	1300	81.9	83.0	80.4	81.4	68.7	72.9	6866	78.4
1995	8942.4	1300	85.5	83.6	82.8	81.8	78.5	74.3	7563	86.3
1996	8897.6	1300	82.6	83.4	81.3	81.7	77.9	75.0	7399	84.2
1997	8690.5	1300	82.6	83.3	79.3	81.3	76.3	75.2	7382	84.3
1998	10000.1	1300	96.1	85.1	94.5	83.2	87.8	77.0	8476	96.8
1999	8131.9	1300	82.9	84.8	80.8	82.9	71.4	76.3	7164	81.8
2000	9139.0	1300	86.6	85.0	85.1	83.1	80.0	76.7	7692	87.6
2001	8593.2	1300	86.6	85.2	84.8	83.3	75.5	76.6	7375	84.2
2002	10598.8	1300	95.3	86.1	95.1	84.4	93.1	78.1	8467	96.7
2003	7708.3	1300	72.1	84.9	69.8	83.1	67.7	77.2	6406	73.1
2004	9311.8	1300	85.0	84.9	84.5	83.2	81.5	77.6	7560	86.1
2005	9913.9	1300	98.3	85.9	97.8	84.3	87.1	78.2	8520	97.3
2006	8719.6	1300	83.5	85.7	80.6	84.0	76.6	78.1	7440	84.9
2007	8562.2	1300	78.4	85.3	77.1	83.6	75.2	78.0	6999	79.9
2008	9538.8	1300	89.8	85.5	87.9	83.9	83.5	78.3	7975	90.8
2009	10010.1	1300	99.1	86.3	97.7	84.6	87.9	78.8	8733	99.7
2010	7502.2	1300	73.2	85.6	70.4	83.9	65.9	78.1	6677	76.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		255			152	1
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1631			790	33	
D. Inspection, maintenance or repair without refuelling				57		
E. Testing of plant systems or components	15			57		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	33
L. Human factor related					19	13
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						0
Z. Others		198				
Subtotal	1646	453	0	904	208	47
Total		2099			1159	

7. Equipment Related Full Outages, Analysis by System

System	2010	1991 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems	12	12
13. Reactor Auxiliary Systems		5
14. Safety Systems	72	34
16. Steam generation systems		3
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities	36	4
31. Turbine and auxiliaries		21
32. Feedwater and Main Steam System		13
33. Circulating Water System		0
35. All other I&C Systems	36	1
41. Main Generator Systems		17
42. Electrical Power Supply Systems		15
XX. Miscellaneous Systems	99	1
Total	255	131

FR-40 CHINON-B-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 905.0 MW(e)
Design Net Capacity: 870.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4165.8 GW(e).h
Energy Availability Factor: 52.8%
Load Factor: 52.5%
Operating Factor: 55.9%
Energy Unavailability Factor: 47.2%
Total Off-line Time: 3867 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	577.9	527.8	0.0	0.0	290.2	617.6	203.0	0.0	26.6	604.8	645.9	672.0	4165.8
EAF (%)	86.1	86.8	0.0	0.0	43.6	96.1	30.9	0.0	4.3	89.9	99.2	99.7	52.8
UCF (%)	86.1	86.8	0.0	0.0	43.6	96.1	30.9	0.0	7.6	91.6	99.2	99.7	53.2
LF (%)	85.8	86.8	0.0	0.0	43.1	94.8	30.1	0.0	4.1	89.7	99.1	99.8	52.5
OF (%)	92.2	88.7	0.0	0.0	47.0	100.0	37.0	0.0	12.8	95.3	100.0	100.0	55.9
EUF (%)	13.9	13.2	100.0	100.0	56.4	3.9	69.1	100.0	95.7	10.1	0.8	0.3	47.2
PUF (%)	0.0	0.1	0.0	0.0	0.0	0.3	48.3	100.0	24.1	2.2	0.1	0.1	14.8
UCLF (%)	13.9	13.1	100.0	100.0	56.4	3.6	20.8	0.0	68.3	6.2	0.8	0.2	32.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.7	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 03 Jan 1977 **Lifetime Generation:** 157976.1 GW(e).h
Date of First Criticality: 28/10/1982 **Cumulative Energy Availability Factor:** 76.8%
Date of Grid Connection: 30/11/1982 **Cumulative Load Factor:** 72.6%
Date of Commercial Operation: 02 Jan 1984 **Cumulative Unit Capability Factor:** 78.8%
Cumulative Energy Unavailability Factor: 23.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	3925.0	870	57.6	57.6	57.6	57.6	56.1	56.1	4835	60.1
1985	5978.2	870	84.5	71.6	82.1	70.4	78.4	67.8	7402	84.5
1986	6322.2	870	86.1	76.6	86.1	75.7	83.0	73.0	7609	86.9
1987	4914.1	870	73.7	75.8	72.9	75.0	64.5	70.8	6438	73.5
1988	5271.0	870	97.4	80.2	96.2	79.3	69.0	70.4	7195	81.9
1989	4734.3	870	64.4	77.5	63.6	76.7	62.1	69.0	5724	65.3
1990	5913.0	870	79.3	77.8	79.1	77.0	77.6	70.3	7043	80.4
1991	5339.2	905	68.0	76.5	67.7	75.8	67.3	69.9	6033	68.9
1992	5972.0	905	80.9	77.0	80.6	76.4	75.1	70.5	7133	81.2
1993	5651.7	905	77.7	77.1	73.3	76.0	71.3	70.6	6914	78.9
1994	5366.3	905	71.9	76.6	71.4	75.6	67.7	70.3	6347	72.5
1995	6333.9	905	85.6	77.4	84.4	76.4	79.9	71.1	7573	86.4
1996	6295.2	905	83.6	77.9	83.4	76.9	79.2	71.8	7476	85.1
1997	6093.3	905	81.9	78.2	81.8	77.3	76.9	72.1	7268	83.0
1998	6631.3	905	87.1	78.8	85.7	77.8	83.6	72.9	7759	88.6
1999	6214.0	905	84.3	79.1	82.1	78.1	78.4	73.3	7483	85.4
2000	6166.8	905	83.6	79.4	82.7	78.4	77.6	73.5	7416	84.4
2001	5769.0	905	82.6	79.6	81.2	78.5	72.8	73.5	7260	82.9
2002	6229.3	920	88.8	80.1	85.6	78.9	77.3	73.7	7671	87.6
2003	5181.7	905	71.0	79.6	68.4	78.4	65.4	73.3	6357	72.6
2004	6252.6	905	83.7	79.8	83.7	78.6	78.7	73.5	7536	85.8
2005	6465.8	905	84.5	80.0	83.9	78.9	81.5	73.9	7611	86.9
2006	6637.8	905	87.3	80.4	86.7	79.2	83.7	74.3	7873	89.9
2007	4538.8	905	61.0	79.5	57.7	78.3	57.3	73.6	5559	63.5
2008	6893.1	905	88.1	79.9	86.9	78.7	86.7	74.1	7862	89.5
2009	4345.8	905	78.5	79.8	55.1	77.8	54.8	73.4	5003	57.1
2010	4165.8	905	53.2	78.8	52.8	76.8	52.5	72.6	4893	55.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2524			340	
B. Refuelling without a maintenance	1248			9	3	
C. Inspection, maintenance or repair combined with refuelling				1046	59	
E. Testing of plant systems or components	0			7	1	
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					46	
L. Human factor related					10	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			24		14	56
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		72				
Z. Others					23	
Subtotal	1248	2596	24	1062	500	60
Total		3868			1622	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems	6	5
13. Reactor Auxiliary Systems		25
14. Safety Systems		16
15. Reactor Cooling Systems		12
16. Steam generation systems		11
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries	27	127
32. Feedwater and Main Steam System	192	11
41. Main Generator Systems	2272	61
42. Electrical Power Supply Systems		28
XX. Miscellaneous Systems	27	4
Total	2524	305

FR-41 CHINON-B-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP
at the beginning of 2010: 905.0 MW(e)
Design Net Capacity: 870.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5735.1 GW(e).h
Energy Availability Factor: 72.9%
Load Factor: 72.3%
Operating Factor: 74.9%
Energy Unavailability Factor: 27.1%
Total Off-line Time: 2199 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	671.6	534.1	643.7	644.0	617.4	623.3	655.1	619.0	210.0	0.0	0.0	516.9	5735.1
EAF (%)	99.6	87.6	95.8	99.6	92.5	97.4	99.4	93.7	32.7	0.0	0.0	76.6	72.9
UCF (%)	99.6	87.6	95.9	99.6	92.5	97.8	99.4	93.7	32.9	0.0	11.7	76.6	74.0
LF (%)	99.7	87.8	95.7	98.8	91.7	95.7	97.3	91.9	32.2	0.0	0.0	76.8	72.3
OF (%)	100.0	87.9	98.5	100.0	100.0	100.0	100.0	94.8	33.5	0.0	0.0	83.3	74.9
EUJ (%)	0.4	12.4	4.2	0.4	7.5	2.6	0.6	6.3	67.3	100.0	100.0	23.4	27.1
PUF (%)	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.3	66.8	100.0	3.1	5.8	14.8
UCLF (%)	0.2	12.3	4.0	0.3	7.3	2.1	0.4	6.0	0.3	0.0	85.2	17.7	11.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.2	0.0	11.7	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 03 Jan 1977 **Lifetime Generation:** 154195.6 GW(e).h
Date of First Criticality: 23/09/1983 **Cumulative Energy Availability Factor:** 78.0%
Date of Grid Connection: 29/11/1983 **Cumulative Load Factor:** 73.2%
Date of Commercial Operation: 08 Jan 1984 **Cumulative Unit Capability Factor:** 79.4%
Cumulative Energy Unavailability Factor: 22.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	2423.0	870	91.7	91.7	91.7	91.7	75.8	75.8	2985	81.3
1985	5037.4	870	69.3	75.9	67.9	74.9	66.1	69.0	6201	70.8
1986	6215.1	870	86.4	80.3	86.0	79.5	81.6	74.2	7639	87.2
1987	5618.8	870	81.1	80.5	80.7	79.9	73.7	74.0	7171	81.9
1988	4425.0	870	68.4	77.8	67.3	77.0	57.9	70.4	5731	65.2
1989	6043.4	870	94.4	80.8	91.2	79.6	79.3	72.0	7873	89.9
1990	5217.0	870	84.4	81.4	84.1	80.3	68.5	71.5	6714	76.6
1991	3142.2	870	55.8	77.9	53.2	76.7	41.2	67.4	3921	44.8
1992	6295.4	870	82.0	78.4	80.8	77.2	82.4	69.2	7321	83.3
1993	5491.6	870	81.4	78.7	76.2	77.1	72.1	69.5	6867	78.4
1994	6174.6	905	84.7	79.3	83.9	77.7	77.9	70.3	7407	84.6
1995	6356.3	905	86.1	79.9	86.0	78.5	80.2	71.2	7741	88.4
1996	5287.6	905	69.6	79.1	69.4	77.7	66.5	70.8	6206	70.7
1997	6637.9	905	86.5	79.7	85.2	78.3	83.7	71.8	7622	87.0
1998	6186.4	905	80.4	79.7	79.9	78.4	78.0	72.3	7136	81.5
1999	5900.9	905	79.1	79.7	79.0	78.5	74.4	72.4	7075	80.8
2000	6177.0	905	81.2	79.8	80.8	78.6	77.7	72.7	7260	82.7
2001	6646.2	905	88.5	80.3	87.5	79.1	83.8	73.4	7846	89.6
2002	6155.6	920	86.4	80.6	85.6	79.5	76.4	73.5	7404	84.5
2003	5746.2	905	81.3	80.7	78.7	79.4	72.5	73.5	7163	81.8
2004	6133.4	905	80.9	80.7	80.6	79.5	77.2	73.7	7252	82.6
2005	6659.6	905	88.0	81.0	86.5	79.8	84.0	74.2	7882	90.0
2006	4548.8	905	61.4	80.1	60.1	78.9	57.4	73.4	5503	62.8
2007	5965.9	905	77.9	80.0	76.6	78.8	75.3	73.5	7023	80.2
2008	5038.3	905	64.9	79.4	64.2	78.2	63.4	73.1	5852	66.6
2009	6111.5	905	83.8	79.6	77.9	78.2	77.1	73.2	7485	85.4
2010	5735.1	905	74.0	79.4	72.9	78.0	72.3	73.2	6561	74.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		793			456	
B. Refuelling without a maintenance				90	6	
C. Inspection, maintenance or repair combined with refuelling	1246			932	9	
D. Inspection, maintenance or repair without refuelling				3		
E. Testing of plant systems or components	4			16	1	
H. Nuclear regulatory requirements					19	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	45
L. Human factor related					15	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			84			
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		72				
Z. Others					20	
Subtotal	1250	865	84	1041	536	45
Total		2199			1622	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems	214	12
13. Reactor Auxiliary Systems		33
14. Safety Systems	101	31
15. Reactor Cooling Systems		59
16. Steam generation systems		55
21. Fuel Handling and Storage Facilities		3
31. Turbine and auxiliaries	39	62
32. Feedwater and Main Steam System		18
33. Circulating Water System		5
35. All other I&C Systems		1
41. Main Generator Systems	92	28
42. Electrical Power Supply Systems		53
XX. Miscellaneous Systems	347	5
Total	793	379

FR-56 CHINON-B-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 905.0 MW(e)
Design Net Capacity: 905.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6488.8 GW(e).h
Energy Availability Factor: 82.5%
Load Factor: 81.8%
Operating Factor: 85.4%
Energy Unavailability Factor: 17.5%
Total Off-line Time: 1275 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	431.7	507.3	650.6	612.5	604.1	600.5	654.7	662.7	645.7	670.9	257.1	191.1	6488.8
EAF (%)	64.7	83.7	96.9	94.1	90.2	93.5	99.3	99.7	99.8	99.7	39.5	28.4	82.5
UCF (%)	64.7	83.7	96.9	94.1	90.2	93.5	99.3	99.7	99.8	99.7	39.8	28.4	82.5
LF (%)	64.1	83.4	96.8	94.0	89.7	92.2	97.2	98.4	99.1	99.5	39.5	28.4	81.8
OF (%)	74.9	89.1	99.7	99.4	93.4	95.6	100.0	100.0	100.0	100.0	40.3	33.1	85.4
EUf (%)	35.3	16.3	3.1	5.9	9.8	6.5	0.7	0.3	0.2	0.3	60.5	71.6	17.5
PUF (%)	6.4	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.2	60.2	38.8	8.9
UCLF (%)	28.9	16.2	3.0	5.8	9.7	6.5	0.5	0.2	0.1	0.1	0.0	32.8	8.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 10 Jan 1980
Date of First Criticality: 18/09/1986
Date of Grid Connection: 20/10/1986
Date of Commercial Operation: 03 Apr 1987

Lifetime Generation: 138664.6 GW(e).h
Cumulative Energy Availability Factor: 78.0%
Cumulative Load Factor: 72.7%
Cumulative Unit Capability Factor: 79.9%
Cumulative Energy Unavailability Factor: 22.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	3322.3	870	67.6	67.6	67.6	67.6	52.0	52.0	4383	59.7
1988	4413.0	905	61.5	64.2	58.9	62.8	55.5	53.9	5354	61.0
1989	5028.6	905	81.2	70.3	77.8	68.1	63.4	57.3	6125	69.9
1990	5417.6	905	69.2	70.0	69.1	68.4	68.3	60.2	6274	71.6
1991	7026.4	905	92.9	74.7	90.7	73.0	88.6	66.1	8204	93.7
1992	6091.5	905	87.5	76.9	85.6	75.2	76.6	67.9	7468	85.0
1993	5600.7	905	78.3	77.1	72.6	74.8	70.6	68.3	6827	77.9
1994	5064.0	905	76.2	77.0	75.5	74.9	63.9	67.8	6325	72.2
1995	6005.6	905	83.3	77.7	82.5	75.8	75.8	68.7	7177	81.9
1996	6278.0	905	87.2	78.7	86.9	76.9	79.0	69.7	7761	88.4
1997	5816.8	905	85.1	79.3	85.1	77.7	73.4	70.1	7249	82.8
1998	6345.6	905	84.1	79.7	81.3	78.0	80.0	70.9	7472	85.3
1999	5602.0	905	74.8	79.3	72.2	77.5	70.7	70.9	6656	76.0
2000	6330.1	905	83.1	79.6	82.5	77.9	79.6	71.5	7386	84.1
2001	6318.0	905	87.0	80.1	84.8	78.3	79.7	72.1	7665	87.5
2002	6720.4	920	90.1	80.7	87.6	78.9	83.4	72.8	7971	91.0
2003	5807.7	905	77.7	80.6	77.6	78.9	73.3	72.8	6954	79.4
2004	5784.4	905	82.5	80.7	82.3	79.1	72.8	72.8	7444	84.7
2005	5595.4	905	79.1	80.6	76.5	78.9	70.6	72.7	7287	83.2
2006	6369.7	905	89.0	81.0	86.3	79.3	80.3	73.1	7930	90.5
2007	6061.3	905	80.2	81.0	77.9	79.2	76.5	73.3	7310	83.4
2008	6498.1	905	83.5	81.1	82.3	79.4	81.7	73.6	7760	88.3
2009	3433.5	905	52.1	79.8	43.4	77.8	43.3	72.3	4114	47.0
2010	6488.8	905	82.5	79.9	82.5	78.0	81.8	72.7	7485	85.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		269			327	
B. Refuelling without a maintenance	684			27	3	
C. Inspection, maintenance or repair combined with refuelling				946	30	
D. Inspection, maintenance or repair without refuelling				36		
E. Testing of plant systems or components	0			32	1	
H. Nuclear regulatory requirements					16	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					17	
L. Human factor related					9	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						28
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		72				
Z. Others		251			34	
Subtotal	684	592	0	1041	437	28
Total		1276			1506	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	12	30
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		39
14. Safety Systems		2
15. Reactor Cooling Systems		29
16. Steam generation systems		20
21. Fuel Handling and Storage Facilities	26	0
31. Turbine and auxiliaries	99	72
32. Feedwater and Main Steam System	54	30
33. Circulating Water System		3
35. All other I&C Systems	10	
41. Main Generator Systems		30
42. Electrical Power Supply Systems		6
XX. Miscellaneous Systems	68	2
Total	269	267

FR-57 CHINON-B-4

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 905.0 MW(e)
Design Net Capacity: 905.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4302.6 GW(e).h
Energy Availability Factor: 54.3%
Load Factor: 54.3%
Operating Factor: 56.0%
Energy Unavailability Factor: 45.7%
Total Off-line Time: 3858 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	640.1	604.5	663.1	342.8	0.0	0.0	0.0	0.0	79.1	661.9	640.9	670.3	4302.6
EAF (%)	95.3	99.4	98.8	52.7	0.0	0.0	0.0	0.0	12.2	98.4	98.4	99.5	54.3
UCF (%)	95.3	99.4	98.8	52.7	0.0	0.0	0.0	0.0	18.5	99.3	98.9	99.5	55.0
LF (%)	95.1	99.4	98.6	52.6	0.0	0.0	0.0	0.0	12.1	98.2	98.4	99.5	54.3
OF (%)	100.0	100.0	100.0	53.6	0.0	0.0	0.0	0.0	20.6	100.0	100.0	100.0	56.0
EUF (%)	4.7	0.6	1.2	47.3	100.0	100.0	100.0	100.0	87.8	1.6	1.6	0.5	45.7
PUF (%)	0.1	0.1	0.2	46.9	100.0	100.0	28.8	0.0	8.3	0.4	0.1	0.1	23.8
UCLF (%)	4.7	0.5	1.0	0.4	0.0	0.0	71.2	100.0	73.2	0.3	1.0	0.4	21.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	0.9	0.5	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 02 Jan 1981
Date of First Criticality: 13/10/1987
Date of Grid Connection: 14/11/1987
Date of Commercial Operation: 04 Jan 1988

Lifetime Generation: 133525.7 GW(e).h
Cumulative Energy Availability Factor: 78.6%
Cumulative Load Factor: 73.4%
Cumulative Unit Capability Factor: 81.0%
Cumulative Energy Unavailability Factor: 21.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]	Cumul.	Factor [%]	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	3367.0	905	89.0	89.0	86.2	86.2	56.4	56.4	4475	67.8
1989	4688.1	905	63.6	74.5	60.4	71.5	59.1	57.9	5664	64.7
1990	6098.0	905	77.2	75.5	77.0	73.5	76.9	64.8	7003	79.9
1991	6340.0	905	80.0	76.7	79.2	75.0	80.0	68.9	7204	82.2
1992	6388.0	905	85.0	78.4	82.8	76.7	80.4	71.3	7544	85.9
1993	6016.9	905	85.8	79.7	80.1	77.3	75.9	72.1	7359	84.0
1994	5935.1	905	82.4	80.1	81.2	77.8	74.9	72.5	7196	82.1
1995	6566.0	905	88.2	81.2	87.9	79.1	82.8	73.8	7805	89.1
1996	6574.2	905	87.6	81.9	87.0	80.0	82.7	74.8	7764	88.4
1997	6345.4	905	88.7	82.6	85.6	80.6	80.0	75.4	7795	89.0
1998	5940.1	905	83.1	82.7	80.2	80.6	74.9	75.3	7326	83.6
1999	5596.3	905	89.9	83.3	88.2	81.2	70.6	74.9	7059	80.6
2000	5110.7	905	74.1	82.5	72.9	80.6	64.3	74.1	6445	73.4
2001	5765.0	905	81.3	82.5	79.9	80.5	72.7	74.0	7078	80.8
2002	6321.3	920	85.8	82.7	84.3	80.8	78.4	74.3	7584	86.6
2003	6431.8	905	87.7	83.0	86.6	81.2	81.1	74.7	7811	89.2
2004	5513.2	905	75.1	82.5	74.9	80.8	69.4	74.4	6883	78.4
2005	5356.4	905	71.1	81.9	69.7	80.2	67.6	74.0	7030	80.3
2006	6369.0	905	84.4	82.0	83.3	80.3	80.3	74.4	7558	86.3
2007	6485.7	905	86.1	82.2	84.8	80.5	81.8	74.7	7691	87.8
2008	5863.5	905	77.1	82.0	75.6	80.3	73.8	74.7	6881	78.3
2009	5250.9	905	85.8	82.2	67.4	79.7	66.2	74.3	6232	71.1
2010	4302.6	905	55.0	81.0	54.3	78.6	54.3	73.4	4902	56.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1482			287	
B. Refuelling without a maintenance				63	0	
C. Inspection, maintenance or repair combined with refuelling	2013			764	87	
E. Testing of plant systems or components	0			27		
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	20	23
L. Human factor related					3	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			46		6	64
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		72				
Z. Others		246			21	
Subtotal	2013	1800	46	854	425	87
Total		3859			1366	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	880	25
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		35
14. Safety Systems	40	6
15. Reactor Cooling Systems	11	52
16. Steam generation systems	192	2
21. Fuel Handling and Storage Facilities	173	2
31. Turbine and auxiliaries	36	27
32. Feedwater and Main Steam System	20	15
33. Circulating Water System		6
35. All other I&C Systems		1
41. Main Generator Systems	10	50
42. Electrical Power Supply Systems	96	17
XX. Miscellaneous Systems	24	2
Total	1482	257

FR-62 CHOOZ-B-1

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1500.0 MW(e)
 Design Net Capacity: 1455.0 MW(e)
 Design Discharge Burnup: 39000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8663.0 GW(e).h
 Energy Availability Factor: 65.9%
 Load Factor: 65.9%
 Operating Factor: 68.1%
 Energy Unavailability Factor: 34.1%
 Total Off-line Time: 2798 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1074.4	925.3	1059.6	1029.0	236.1	0.0	0.0	20.7	1014.6	1093.1	1080.3	1129.8	8663.0
EAF (%)	96.3	92.0	95.6	95.5	21.2	0.0	0.0	1.9	94.5	97.3	99.8	100.0	65.9
UCF (%)	96.3	92.1	95.7	95.6	21.3	0.0	0.0	1.9	94.7	97.6	100.0	100.0	66.0
LF (%)	96.3	91.8	95.1	95.3	21.2	0.0	0.0	1.9	93.9	97.8	100.0	101.2	65.9
OF (%)	100.0	96.4	100.0	100.0	22.6	0.0	0.0	5.1	98.5	97.7	100.0	100.0	68.1
EUf (%)	3.7	8.0	4.4	4.5	78.8	100.0	100.0	98.1	5.5	2.7	0.2	0.0	34.1
PUF (%)	0.0	0.1	0.0	0.0	77.7	100.0	100.0	77.1	2.5	0.2	0.0	0.0	30.1
UCLF (%)	3.7	7.9	4.3	4.4	1.0	0.0	0.0	21.0	2.9	2.3	0.0	0.0	3.9
XUF (%)	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.2	0.3	0.1	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 01 Jan 1984 Lifetime Generation: 118998.3 GW(e).h
 Date of First Criticality: 25/07/1996 Cumulative Energy Availability Factor: 79.0%
 Date of Grid Connection: 30/08/1996 Cumulative Load Factor: 76.9%
 Date of Commercial Operation: 15/05/2000 Cumulative Unit Capability Factor: 80.8%
 Cumulative Energy Unavailability Factor: 21.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	8420.9	1455	96.9	96.9	96.9	96.9	98.4	98.4	5711	97.1
2001	9524.4	1455	78.0	85.6	75.0	83.8	74.7	84.2	6800	77.6
2002	9515.1	1455	82.4	84.4	81.0	82.7	74.7	80.7	6807	77.7
2003	10021.9	1500	89.4	85.8	85.6	83.5	76.3	79.4	7219	82.4
2004	10671.1	1500	86.7	86.0	83.6	83.6	81.0	79.8	7657	87.2
2005	9047.7	1500	70.5	83.2	69.6	81.1	68.8	77.8	6285	71.7
2006	9845.7	1500	77.6	82.4	75.6	80.2	74.9	77.4	6885	78.6
2007	10402.3	1500	80.7	82.1	79.6	80.2	79.2	77.6	7154	81.7
2008	12376.7	1500	97.0	83.9	95.0	81.9	93.9	79.5	8572	97.6
2009	8649.5	1500	69.0	82.3	67.5	80.4	65.8	78.1	6307	72.0
2010	8663.0	1500	66.0	80.8	65.9	79.0	65.9	76.9	5962	68.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1997 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		41			797	
B. Refuelling without a maintenance				97		
C. Inspection, maintenance or repair combined with refuelling	2590			450		
E. Testing of plant systems or components				125		
H. Nuclear regulatory requirements		11			1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						8
L. Human factor related					78	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						12
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						7
Z. Others		156			116	
Subtotal	2590	208	0	672	992	27
Total		2798			1691	

7. Equipment Related Full Outages, Analysis by System

System	2010	1997 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems	17	62
13. Reactor Auxiliary Systems		20
15. Reactor Cooling Systems		63
16. Steam generation systems		10
31. Turbine and auxiliaries	6	512
32. Feedwater and Main Steam System		9
35. All other I&C Systems	18	
41. Main Generator Systems		2
42. Electrical Power Supply Systems		68
XX. Miscellaneous Systems		4
Total	41	753

FR-70 CHOOZ-B-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1500.0 MW(e)
Design Net Capacity: 1455.0 MW(e)
Design Discharge Burnup: 39000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10739.8 GW(e).h
Energy Availability Factor: 83.4%
Load Factor: 81.7%
Operating Factor: 85.9%
Energy Unavailability Factor: 16.6%
Total Off-line Time: 1231 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1097.0	983.1	1091.3	932.0	1076.2	1019.3	970.0	1066.5	933.0	26.0	450.7	1094.7	10739.8
EAF (%)	99.9	99.6	99.8	87.9	99.6	99.4	90.5	95.8	86.4	2.3	41.7	98.8	83.4
UCF (%)	100.0	99.6	100.0	88.1	100.0	100.0	91.7	99.9	99.9	2.9	53.4	98.8	86.1
LF (%)	98.3	97.5	97.9	86.3	96.4	94.4	86.9	95.6	86.4	2.3	41.7	98.1	81.7
OF (%)	100.0	100.0	100.0	88.6	100.0	100.0	91.9	100.0	100.0	3.2	48.9	100.0	85.9
EUf (%)	0.1	0.4	0.2	12.1	0.4	0.6	9.5	4.2	13.6	97.7	58.3	1.2	16.6
PUF (%)	0.0	0.2	0.0	0.8	0.0	0.0	0.1	0.1	0.1	88.0	22.9	0.0	9.5
UCLF (%)	0.0	0.2	0.0	11.1	0.0	0.0	8.2	0.0	0.0	9.1	23.8	1.1	4.4
XUF (%)	0.0	0.1	0.2	0.2	0.4	0.6	1.2	4.2	13.5	0.6	11.7	0.1	2.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 31/12/1985 Lifetime Generation: 118106.8 GW(e).h
Date of First Criticality: 03 Oct 1997 Cumulative Energy Availability Factor: 80.1%
Date of Grid Connection: 04 Oct 1997 Cumulative Load Factor: 77.3%
Date of Commercial Operation: 29/09/2000 Cumulative Unit Capability Factor: 83.1%
Cumulative Energy Unavailability Factor: 19.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	3353.3	1455	77.6	77.6	77.6	77.6	78.7	78.7	2473	84.5
2001	10159.5	1455	83.4	82.0	80.4	79.7	79.7	79.5	7221	82.4
2002	9814.8	1455	83.0	82.4	81.5	80.5	77.0	78.4	7240	82.6
2003	10472.8	1500	87.6	84.0	83.3	81.3	79.7	78.8	7457	85.1
2004	10063.9	1500	88.0	85.0	80.1	81.0	76.4	78.2	7061	80.4
2005	10321.5	1500	84.1	84.8	81.6	81.2	78.6	78.3	7343	83.8
2006	9460.5	1500	81.6	84.3	79.6	80.9	72.0	77.3	6845	78.1
2007	11016.5	1500	86.8	84.6	85.2	81.5	83.8	78.2	7725	88.2
2008	11038.9	1500	86.1	84.8	84.6	81.9	83.8	78.9	7639	87.0
2009	7821.9	1500	66.0	82.8	62.5	79.8	59.5	76.8	5593	63.8
2010	10739.8	1500	86.1	83.1	83.4	80.1	81.7	77.3	7529	85.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1997 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		336			754	
B. Refuelling without a maintenance	767			49		
C. Inspection, maintenance or repair combined with refuelling				610		
E. Testing of plant systems or components	4			105	0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						63
L. Human factor related					22	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			84		17	
Z. Others		42			67	
Subtotal	771	378	84	764	860	63
Total		1233			1687	

7. Equipment Related Full Outages, Analysis by System

System	2010	1997 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems	10	81
13. Reactor Auxiliary Systems		48
15. Reactor Cooling Systems		9
21. Fuel Handling and Storage Facilities	192	
31. Turbine and auxiliaries	24	508
32. Feedwater and Main Steam System	4	0
33. Circulating Water System		42
41. Main Generator Systems		9
42. Electrical Power Supply Systems	106	19
XX. Miscellaneous Systems		18
Total	336	735

FR-72 CIVAUX-1

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1495.0 MW(e)
 Design Net Capacity: 1450.0 MW(e)
 Design Discharge Burnup: 35000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10590.1 GW(e).h
 Energy Availability Factor: 81.5%
 Load Factor: 80.9%
 Operating Factor: 86.6%
 Energy Unavailability Factor: 18.5%
 Total Off-line Time: 1178 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1055.1	951.9	809.9	339.5	0.0	954.2	1073.3	1076.4	1050.9	1093.0	1068.8	1117.1	10590.1
EAF (%)	95.0	95.0	73.1	31.5	0.0	90.1	97.8	98.6	99.1	98.6	99.7	100.0	81.5
UCF (%)	95.0	95.0	73.1	31.5	0.0	92.4	99.1	99.4	99.6	100.0	99.8	100.0	82.0
LF (%)	94.9	94.8	72.9	31.5	0.0	88.6	96.5	96.8	97.6	98.1	99.3	100.4	80.9
OF (%)	100.0	100.0	91.8	53.3	0.0	94.9	100.0	100.0	100.0	100.0	100.0	100.0	86.6
EUf (%)	5.0	5.0	26.9	68.5	100.0	9.9	2.2	1.4	0.9	1.4	0.3	0.0	18.5
PUF (%)	0.0	0.0	0.0	47.0	100.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	12.6
UCLF (%)	5.0	5.0	26.9	21.4	0.0	4.1	0.9	0.6	0.5	0.0	0.2	0.0	5.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	2.3	1.3	0.8	0.4	1.3	0.1	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 15/10/1988
 Date of First Criticality: 29/11/1997
 Date of Grid Connection: 24/12/1997
 Date of Commercial Operation: 29/01/2002

Lifetime Generation: 105249.2 GW(e).h
 Cumulative Energy Availability Factor: 78.1%
 Cumulative Load Factor: 77.2%
 Cumulative Unit Capability Factor: 79.5%
 Cumulative Energy Unavailability Factor: 21.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	9544.1	1450	81.0	81.0	79.8	79.8	75.1	75.1	7331	83.7
2003	10932.1	1495	84.1	82.6	83.1	81.4	83.5	79.4	7438	84.9
2004	11276.5	1495	88.0	84.4	86.9	83.3	85.9	81.6	7816	89.0
2005	9672.3	1495	76.3	82.3	73.8	80.9	73.8	79.6	6855	78.2
2006	10318.2	1495	80.9	82.1	79.3	80.6	78.8	79.5	7189	82.1
2007	9031.5	1495	69.6	80.0	69.4	78.7	69.0	77.7	6242	71.2
2008	9873.0	1495	77.0	79.6	76.0	78.3	75.2	77.3	6967	79.3
2009	9494.4	1495	76.5	79.2	73.4	77.7	72.5	76.7	6852	78.2
2010	10590.1	1495	82.0	79.5	81.5	78.1	80.9	77.2	7582	86.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2002 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		86			390	
B. Refuelling without a maintenance	1081			142		
C. Inspection, maintenance or repair combined with refuelling				638		
E. Testing of plant systems or components				23		
H. Nuclear regulatory requirements					6	
L. Human factor related					31	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						13
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			12			26
Z. Others					109	
Subtotal	1081	86	12	803	536	39
Total		1179			1378	

7. Equipment Related Full Outages, Analysis by System

System	2010	2002 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		6
14. Safety Systems		19
15. Reactor Cooling Systems		36
16. Steam generation systems		1
21. Fuel Handling and Storage Facilities	25	1
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		11
33. Circulating Water System		14
35. All other I&C Systems		16
41. Main Generator Systems		33
42. Electrical Power Supply Systems	61	215
XX. Miscellaneous Systems		12
Total	86	384

FR-73 CIVAUX-2

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1495.0 MW(e)
 Design Net Capacity: 1450.0 MW(e)
 Design Discharge Burnup: 35000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11094.0 GW(e).h
 Energy Availability Factor: 86.1%
 Load Factor: 84.7%
 Operating Factor: 88.4%
 Energy Unavailability Factor: 13.9%
 Total Off-line Time: 1017 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1107.0	999.5	1018.4	1057.4	1041.7	1032.5	1065.7	1082.4	972.2	437.6	183.4	1096.2	11094.0
EAF (%)	100.0	100.0	93.3	99.9	97.3	99.1	98.6	98.1	90.3	39.3	17.1	99.9	86.1
UCF (%)	100.0	100.0	93.3	100.0	97.4	99.9	99.6	100.0	100.0	48.6	24.1	99.9	88.5
LF (%)	99.5	99.5	91.7	98.2	93.7	95.9	95.8	97.3	90.3	39.3	17.0	98.6	84.7
OF (%)	100.0	100.0	93.5	100.0	97.8	100.0	100.0	100.0	100.0	48.2	21.3	100.0	88.4
EUf (%)	0.0	0.0	6.7	0.1	2.7	0.9	1.4	1.9	9.7	60.7	82.9	0.1	13.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	51.4	52.8	0.1	8.7
UCLF (%)	0.0	0.0	6.7	0.0	2.6	0.1	0.2	0.0	0.0	0.0	23.0	0.0	2.7
XUF (%)	0.0	0.0	0.0	0.1	0.1	0.8	1.0	1.8	9.7	9.3	7.1	0.0	2.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 04 Jan 1991 Lifetime Generation: 106783.8 GW(e).h
 Date of First Criticality: 27/11/1999 Cumulative Energy Availability Factor: 83.2%
 Date of Grid Connection: 24/12/1999 Cumulative Load Factor: 79.9%
 Date of Commercial Operation: 23/04/2002 Cumulative Unit Capability Factor: 85.0%
 Cumulative Energy Unavailability Factor: 16.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	7199.1	1450	94.6	94.6	92.0	92.0	75.2	75.2	5751	87.1
2003	9084.8	1495	70.5	80.7	70.4	79.5	69.4	71.8	6542	74.7
2004	11698.6	1495	90.0	84.1	89.6	83.2	89.1	78.2	8042	91.6
2005	9621.4	1495	75.9	81.9	73.5	80.6	73.5	76.9	6748	77.0
2006	11140.1	1495	91.6	84.0	89.8	82.5	85.1	78.6	7811	89.2
2007	9973.8	1495	82.3	83.7	80.2	82.1	76.1	78.2	7141	81.5
2008	11321.5	1495	91.1	84.8	89.0	83.2	86.2	79.4	8085	92.0
2009	10293.3	1495	82.8	84.5	80.1	82.8	78.6	79.3	7219	82.4
2010	11094.0	1495	88.5	85.0	86.1	83.2	84.7	79.9	7743	88.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2002 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		230			168	
B. Refuelling without a maintenance	731			142	2	
C. Inspection, maintenance or repair combined with refuelling				659		
E. Testing of plant systems or components				21		
H. Nuclear regulatory requirements					3	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						16
L. Human factor related					18	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			57			8
Z. Others					28	
Subtotal	731	230	57	822	219	25
Total		1018			1066	

7. Equipment Related Full Outages, Analysis by System

System	2010	2002 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		38
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems	35	32
14. Safety Systems	79	8
15. Reactor Cooling Systems		27
21. Fuel Handling and Storage Facilities	52	18
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		7
33. Circulating Water System		2
42. Electrical Power Supply Systems	48	9
XX. Miscellaneous Systems	16	10
Total	230	164

FR-42 CRUAS-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 880.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6529.5 GW(e).h
Energy Availability Factor: 82.2%
Load Factor: 81.5%
Operating Factor: 84.6%
Energy Unavailability Factor: 17.8%
Total Off-line Time: 1347 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	637.6	456.1	653.3	647.3	664.2	234.4	12.7	621.2	623.3	661.0	647.4	671.2	6529.5
EAF (%)	94.6	75.4	97.7	98.4	98.5	35.7	1.9	92.2	96.2	97.5	98.6	98.9	82.2
UCF (%)	94.6	75.4	99.2	99.2	99.1	36.3	5.1	93.1	98.6	99.0	99.1	98.9	83.2
LF (%)	93.7	74.2	96.1	98.2	97.6	35.6	1.9	91.2	94.6	97.0	98.3	98.6	81.5
OF (%)	95.7	76.6	100.0	100.0	100.0	36.9	5.4	100.0	100.0	100.0	100.0	100.0	84.6
EUF (%)	5.4	24.6	2.3	1.6	1.5	64.3	98.1	7.8	3.8	2.5	1.4	1.1	17.8
PUF (%)	0.1	0.1	0.2	0.1	0.2	63.4	18.2	5.4	0.1	0.1	0.2	0.2	7.3
UCLF (%)	5.3	24.5	0.7	0.7	0.8	0.3	76.7	1.5	1.3	0.9	0.7	0.9	9.5
XUF (%)	0.0	0.0	1.5	0.8	0.6	0.6	3.2	0.9	2.5	1.5	0.4	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 08 Jan 1978
Date of First Criticality: 04 Feb 1983
Date of Grid Connection: 29/04/1983
Date of Commercial Operation: 04 Feb 1984

Lifetime Generation: 152229.4 GW(e).h
Cumulative Energy Availability Factor: 78.8%
Cumulative Load Factor: 71.5%
Cumulative Unit Capability Factor: 81.0%
Cumulative Energy Unavailability Factor: 21.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1984	4800.0	880	82.6	82.6	82.6	82.6	82.6	82.6	82.6	82.6	6130	92.9
1985	5185.2	880	77.2	79.5	72.0	76.5	67.3	73.9	66.15	75.5	6615	75.5
1986	5888.0	880	87.6	82.5	86.0	80.0	76.4	74.8	73.77	84.2	7377	84.2
1987	5359.5	880	83.7	82.8	81.8	80.5	69.5	73.4	68.60	78.3	6860	78.3
1988	4025.0	880	98.0	86.0	96.7	83.9	52.1	68.9	55.62	63.3	5562	63.3
1989	5648.9	880	86.1	86.0	83.6	83.9	73.3	69.7	72.39	82.6	7239	82.6
1990	4983.5	880	84.8	85.8	82.6	83.7	64.6	68.9	68.09	77.7	6809	77.7
1991	4477.8	880	68.2	83.6	65.3	81.3	58.1	67.5	57.62	65.8	5762	65.8
1992	5739.4	880	81.0	83.3	77.8	80.9	74.2	68.3	71.83	81.8	7183	81.8
1993	6156.6	880	87.2	83.7	84.6	81.3	79.9	69.5	73.53	83.9	7353	83.9
1994	6181.2	915	84.5	83.7	84.3	81.6	77.1	70.2	74.98	85.6	7498	85.6
1995	4630.4	915	63.3	81.9	62.5	79.9	57.8	69.1	56.24	64.2	5624	64.2
1996	6258.5	915	83.9	82.1	83.0	80.1	77.9	69.8	74.78	85.1	7478	85.1
1997	5271.2	915	77.9	81.8	74.1	79.7	65.8	69.5	67.84	77.4	6784	77.4
1998	6387.3	915	90.8	82.4	89.5	80.4	79.7	70.2	78.64	89.8	7864	89.8
1999	5890.7	915	85.5	82.6	83.8	80.6	73.5	70.4	73.67	84.1	7367	84.1
2000	6320.5	915	87.6	82.9	86.0	80.9	78.6	70.9	77.42	88.1	7742	88.1
2001	5918.3	915	81.7	82.8	81.1	80.9	73.8	71.1	72.64	82.9	7264	82.9
2002	6069.8	915	80.6	82.7	80.5	80.9	75.7	71.4	73.49	83.9	7349	83.9
2003	6120.5	915	82.5	82.7	81.1	80.9	76.4	71.6	74.03	84.5	7403	84.5
2004	5866.1	915	77.0	82.4	76.1	80.7	73.0	71.7	69.07	78.6	6907	78.6
2005	5345.4	915	71.1	81.9	70.6	80.2	66.7	71.5	63.11	72.0	6311	72.0
2006	6491.0	915	84.8	82.0	83.7	80.4	81.0	71.9	77.16	88.1	7716	88.1
2007	4468.5	915	58.4	81.0	55.9	79.3	55.7	71.2	55.06	62.9	5506	62.9
2008	6281.4	915	80.8	81.0	79.3	79.3	78.2	71.5	72.85	82.9	7285	82.9
2009	5066.6	915	78.8	80.9	63.4	78.7	63.2	71.1	60.16	68.7	6016	68.7
2010	6529.5	915	83.2	81.0	82.2	78.8	81.5	71.5	74.13	84.6	7413	84.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		502			384	
B. Refuelling without a maintenance	565			49	1	
C. Inspection, maintenance or repair combined with refuelling				884	18	
D. Inspection, maintenance or repair without refuelling				23		
E. Testing of plant systems or components				17		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						0
H. Nuclear regulatory requirements					5	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					33	18
L. Human factor related					76	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			24			39
Z. Others		258			26	
Subtotal	565	760	24	973	543	58
Total		1349			1574	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		18
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems	182	7
14. Safety Systems	288	11
15. Reactor Cooling Systems		18
16. Steam generation systems		27
31. Turbine and auxiliaries		28
32. Feedwater and Main Steam System		8
33. Circulating Water System		3
41. Main Generator Systems	8	217
42. Electrical Power Supply Systems		5
XX. Miscellaneous Systems	24	1
Total	502	358

FR-43 CRUAS-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 915.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5305.4 GW(e).h
Energy Availability Factor: 66.6%
Load Factor: 66.2%
Operating Factor: 68.9%
Energy Unavailability Factor: 33.4%
Total Off-line Time: 2724 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	674.0	610.2	665.9	644.4	653.9	625.8	547.2	0.0	0.0	0.0	217.9	666.1	5305.4
EAF (%)	99.9	99.9	98.6	97.8	96.9	95.1	80.5	0.0	0.0	0.0	33.3	98.8	66.6
UCF (%)	99.9	99.9	99.1	99.5	99.4	99.1	85.5	38.7	23.3	18.7	33.4	98.8	74.5
LF (%)	99.0	99.2	98.0	97.8	96.1	95.0	80.4	0.0	0.0	0.0	33.1	97.8	66.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	88.6	0.0	0.0	0.0	40.8	99.5	68.9
EUf (%)	0.1	0.1	1.4	2.2	3.1	4.9	19.5	100.0	100.0	100.0	66.7	1.2	33.4
PUF (%)	0.1	0.1	0.1	0.3	0.6	0.1	0.1	0.0	36.4	40.5	7.5	0.5	7.2
UCLF (%)	0.0	0.0	0.8	0.1	0.0	0.8	14.4	61.3	40.3	40.7	59.1	0.7	18.3
XUF (%)	0.0	0.0	0.5	1.7	2.5	4.0	5.0	38.7	23.3	18.7	0.1	0.0	8.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 15/11/1978
Date of First Criticality: 08 Jan 1984
Date of Grid Connection: 09 Jun 1984
Date of Commercial Operation: 04 Jan 1985

Lifetime Generation: 150743.9 GW(e).h
Cumulative Energy Availability Factor: 77.9%
Cumulative Load Factor: 72.6%
Cumulative Unit Capability Factor: 80.4%
Cumulative Energy Unavailability Factor: 22.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	4844.4	880	98.3	98.3	96.0	96.0	83.4	83.4	6425	97.3
1986	4955.0	880	70.4	82.4	70.1	81.2	64.3	72.5	6258	71.4
1987	5559.9	900	79.8	81.4	79.1	80.4	70.5	71.8	6761	77.2
1988	5698.0	915	85.0	82.4	80.6	80.5	70.9	71.5	7176	81.7
1989	6298.5	915	86.2	83.2	83.3	81.1	78.6	73.0	7697	87.9
1990	6001.8	915	79.8	82.6	77.7	80.5	74.9	73.4	7114	81.2
1991	4099.9	915	55.3	78.5	53.7	76.5	51.2	70.0	4838	55.2
1992	5946.9	915	77.0	78.3	77.0	76.5	74.0	70.6	6910	78.7
1993	5441.0	915	78.1	78.3	73.5	76.2	67.9	70.2	6463	73.8
1994	5566.1	915	96.8	80.2	94.1	78.0	69.4	70.2	6765	77.2
1995	5366.8	915	76.3	79.8	72.4	77.5	67.0	69.9	6581	75.1
1996	6521.9	915	88.8	80.6	87.1	78.3	81.1	70.8	7870	89.6
1997	5176.1	915	80.9	80.6	76.5	78.2	64.6	70.3	6596	75.3
1998	6003.6	915	82.8	80.8	79.0	78.3	74.9	70.7	7396	84.4
1999	6393.8	915	88.1	81.3	85.3	78.7	79.8	71.3	7787	88.9
2000	6420.9	915	87.0	81.7	85.6	79.2	79.9	71.8	7755	88.3
2001	5914.4	915	79.7	81.5	76.5	79.0	73.8	72.0	7053	80.5
2002	6547.4	915	86.5	81.8	86.0	79.4	81.7	72.5	7776	88.8
2003	5727.9	915	75.8	81.5	75.6	79.2	71.5	72.5	6927	79.1
2004	6613.0	915	86.0	81.7	84.9	79.5	82.3	73.0	7661	87.2
2005	6504.1	915	85.8	81.9	83.0	79.7	81.1	73.3	7684	87.7
2006	6509.5	915	85.6	82.1	84.3	79.9	81.2	73.7	7736	88.3
2007	4617.9	915	61.6	81.2	58.0	78.9	57.6	73.0	5602	63.9
2008	5597.4	915	70.9	80.8	69.8	78.5	69.6	72.9	6633	75.5
2009	5862.2	915	78.7	80.7	73.6	78.3	73.1	72.9	6886	78.6
2010	5305.4	915	74.5	80.4	66.6	77.9	66.2	72.6	6036	68.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		835			288	
B. Refuelling without a maintenance	564			24	2	
C. Inspection, maintenance or repair combined with refuelling				906	9	
E. Testing of plant systems or components	0			8	0	
H. Nuclear regulatory requirements					6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					39	
L. Human factor related					55	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			456			3
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			140			2
Z. Others		730			26	
Subtotal	564	1565	596	938	425	5
Total		2725			1368	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		27
12. Reactor I&C Systems	4	6
13. Reactor Auxiliary Systems		1
15. Reactor Cooling Systems		8
16. Steam generation systems		19
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	97	91
32. Feedwater and Main Steam System		11
33. Circulating Water System		1
35. All other I&C Systems		2
41. Main Generator Systems	734	111
42. Electrical Power Supply Systems		0
XX. Miscellaneous Systems		2
Total	835	279

FR-44 CRUAS-3

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
 Design Net Capacity: 880.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6277.8 GW(e).h
 Energy Availability Factor: 78.3%
 Load Factor: 78.3%
 Operating Factor: 80.0%
 Energy Unavailability Factor: 21.7%
 Total Off-line Time: 1756 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	683.9	616.1	673.2	651.0	661.8	638.0	492.0	0.0	25.8	671.9	480.4	683.7	6277.8
EAF (%)	99.9	99.8	99.3	98.8	97.9	97.2	72.4	0.0	4.1	98.2	72.6	99.9	78.3
UCF (%)	99.9	100.0	100.0	99.7	99.9	99.7	74.8	0.0	10.7	98.6	72.7	99.9	79.6
LF (%)	100.5	100.2	99.0	98.8	97.2	96.8	72.3	0.0	3.9	98.6	72.9	100.4	78.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	75.4	0.0	8.8	100.0	76.1	100.0	80.0
EUf (%)	0.1	0.2	0.7	1.2	2.1	2.8	27.6	100.0	95.9	1.8	27.4	0.1	21.7
PUf (%)	0.1	0.1	0.0	0.2	0.1	0.2	25.0	100.0	23.2	1.3	0.5	0.1	12.7
UCLF (%)	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.0	66.1	0.2	26.9	0.0	7.7
XUF (%)	0.0	0.1	0.7	1.0	2.0	2.5	2.5	0.0	6.7	0.3	0.1	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 15/04/1979
 Date of First Criticality: 04 Sep 1984
 Date of Grid Connection: 14/05/1984
 Date of Commercial Operation: 09 Oct 1984

Lifetime Generation: 151971.9 GW(e).h
 Cumulative Energy Availability Factor: 79.5%
 Cumulative Load Factor: 72.1%
 Cumulative Unit Capability Factor: 82.0%
 Cumulative Energy Unavailability Factor: 20.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	2311.0	880	91.9	91.9	91.9	91.9	89.7	89.7	2716	92.7
1985	5247.4	880	74.6	78.9	72.5	77.4	68.1	73.5	6557	74.9
1986	5967.1	880	89.5	83.5	89.2	82.5	77.4	75.2	7456	85.1
1987	4721.4	880	75.7	81.1	75.1	80.3	61.2	71.0	6013	68.6
1988	4773.0	880	99.9	85.5	98.6	84.5	61.7	68.9	6679	76.0
1989	5577.9	880	74.2	83.4	72.8	82.3	72.4	69.5	6571	75.0
1990	6129.2	915	87.5	84.0	85.2	82.8	76.5	70.6	7499	85.6
1991	6003.2	915	85.2	84.2	84.7	83.1	74.9	71.2	7374	84.2
1992	5174.6	915	73.2	82.8	71.0	81.6	64.4	70.4	6323	72.0
1993	5715.3	915	85.7	83.1	73.9	80.7	71.3	70.5	7232	82.6
1994	5014.0	915	78.9	82.7	78.1	80.5	62.6	69.7	6428	73.4
1995	6032.7	915	89.6	83.3	84.3	80.8	75.3	70.2	7525	85.9
1996	5882.2	915	99.7	84.7	91.9	81.7	73.2	70.5	7724	87.9
1997	5347.8	915	86.1	84.8	80.2	81.6	66.7	70.2	6961	79.5
1998	6281.4	915	81.7	84.6	78.7	81.4	78.4	70.8	7758	88.6
1999	6316.7	915	89.8	84.9	87.8	81.8	78.8	71.3	7654	87.4
2000	5494.0	915	81.4	84.7	79.0	81.7	68.4	71.1	6914	78.7
2001	5867.9	915	82.1	84.5	79.6	81.5	73.2	71.2	7254	82.8
2002	6052.0	915	82.1	84.4	80.9	81.5	75.5	71.5	7307	83.4
2003	5779.4	915	79.2	84.1	76.8	81.3	72.1	71.5	7146	81.6
2004	5081.3	915	65.9	83.2	64.1	80.4	63.2	71.1	6074	69.1
2005	6941.6	915	88.3	83.5	87.8	80.7	86.6	71.8	7863	89.8
2006	6487.5	915	83.5	83.5	83.1	80.9	80.9	72.2	7520	85.8
2007	5435.8	915	71.4	83.0	68.1	80.3	67.8	72.0	6456	73.7
2008	4858.6	915	61.0	82.0	60.9	79.5	60.4	71.6	5750	65.5
2009	6366.0	915	84.3	82.1	79.9	79.5	79.4	71.9	7392	84.4
2010	6277.8	915	79.6	82.0	78.3	79.5	78.3	72.1	7004	80.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		181			169	
B. Refuelling without a maintenance				46	1	
C. Inspection, maintenance or repair combined with refuelling	1056			896	31	
D. Inspection, maintenance or repair without refuelling					5	
E. Testing of plant systems or components	7			8		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					19	19
L. Human factor related					89	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			48			5
Z. Others		475			34	0
Subtotal	1063	656	48	950	348	26
Total		1767			1324	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		4
14. Safety Systems		8
15. Reactor Cooling Systems		49
16. Steam generation systems		24
31. Turbine and auxiliaries	108	33
32. Feedwater and Main Steam System		11
41. Main Generator Systems		4
42. Electrical Power Supply Systems	73	8
XX. Miscellaneous Systems		2
Total	181	153

FR-45 CRUAS-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
 Design Net Capacity: 880.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5107.0 GW(e).h
 Energy Availability Factor: 63.8%
 Load Factor: 63.7%
 Operating Factor: 66.0%
 Energy Unavailability Factor: 36.2%
 Total Off-line Time: 2981 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	682.0	604.4	684.8	197.3	0.0	0.0	10.2	598.7	629.7	633.7	655.2	411.1	5107.0
EAF (%)	99.9	97.7	99.6	30.0	0.0	0.0	1.6	88.4	96.8	93.4	99.6	60.3	63.8
UCF (%)	100.0	97.7	99.6	30.1	1.2	0.0	1.6	89.1	99.8	95.0	99.9	97.3	67.5
LF (%)	100.2	98.3	100.7	29.9	0.0	0.0	1.5	87.9	95.6	93.0	99.4	60.4	63.7
OF (%)	100.0	100.0	100.0	30.3	0.0	0.0	5.9	98.1	100.0	95.7	100.0	63.8	66.0
EUF (%)	0.1	2.3	0.4	70.0	100.0	100.0	98.4	11.6	3.2	6.6	0.4	39.7	36.2
PUF (%)	0.1	0.4	0.1	69.9	80.0	0.0	4.2	7.2	0.1	0.1	0.1	0.2	13.6
UCLF (%)	0.0	1.8	0.3	0.0	18.8	100.0	94.1	3.7	0.1	4.9	0.0	2.5	18.9
XUF (%)	0.0	0.0	0.0	0.1	1.2	0.0	0.0	0.7	3.0	1.6	0.2	37.0	3.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 10 Jan 1979 Lifetime Generation: 148054.8 GW(e).h
 Date of First Criticality: 10 Jan 1984 Cumulative Energy Availability Factor: 77.6%
 Date of Grid Connection: 27/10/1984 Cumulative Load Factor: 71.6%
 Date of Commercial Operation: 02 Nov 1985 Cumulative Unit Capability Factor: 79.9%
 Cumulative Energy Unavailability Factor: 22.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	5187.0	880	87.1	87.1	85.7	85.7	73.5	73.5	6759	84.3
1986	5452.6	880	80.3	83.6	76.7	81.0	70.7	72.1	6816	77.8
1987	5313.4	880	85.1	84.1	84.2	82.1	68.9	71.0	6888	78.6
1988	3247.0	880	76.0	82.0	74.2	80.1	42.0	63.6	4271	48.6
1989	4852.2	880	71.4	79.9	71.3	78.3	62.9	63.4	6025	68.8
1990	6215.3	880	86.4	81.0	86.0	79.6	80.6	66.3	7607	86.8
1991	6005.4	880	83.9	81.4	81.1	79.8	77.9	68.0	7259	82.9
1992	4953.6	880	66.0	79.5	65.0	77.9	64.1	67.5	5862	66.7
1993	5280.0	880	84.9	80.1	77.1	77.8	68.5	67.6	6653	75.9
1994	5552.1	915	86.8	80.8	83.8	78.5	69.3	67.8	6856	78.3
1995	6280.3	915	86.0	81.3	82.1	78.8	78.4	68.8	7375	84.2
1996	5886.5	915	80.7	81.2	79.4	78.9	73.2	69.2	7180	81.7
1997	5976.6	915	84.1	81.4	80.2	79.0	74.6	69.6	7334	83.7
1998	6629.2	915	88.7	82.0	85.5	79.5	82.7	70.6	7885	90.0
1999	5829.8	915	85.4	82.2	81.9	79.6	72.7	70.7	7159	81.7
2000	6630.7	915	89.7	82.7	88.4	80.2	82.5	71.5	7915	90.1
2001	5915.8	915	83.3	82.7	80.6	80.2	73.8	71.6	7172	81.9
2002	6399.6	915	83.4	82.8	82.9	80.4	79.8	72.1	7474	85.3
2003	6296.7	915	82.9	82.8	81.6	80.4	78.6	72.4	7371	84.1
2004	6377.4	915	83.4	82.8	80.6	80.4	79.3	72.8	7443	84.7
2005	6255.1	915	81.6	82.7	79.6	80.4	78.0	73.0	7360	84.0
2006	3752.7	915	47.6	81.1	47.6	78.9	46.8	71.8	4259	48.6
2007	4947.3	915	62.0	80.3	61.7	78.1	61.7	71.4	5839	66.7
2008	6228.8	915	78.5	80.2	77.4	78.1	77.5	71.6	7011	79.8
2009	6321.8	915	86.1	80.4	79.5	78.2	78.9	71.9	7347	83.9
2010	5107.0	915	67.5	79.9	63.8	77.6	63.7	71.6	5779	66.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1607			296	
B. Refuelling without a maintenance				84	2	
C. Inspection, maintenance or repair combined with refuelling	1098			757	51	
D. Inspection, maintenance or repair without refuelling				9		
E. Testing of plant systems or components				11		2
G. Major back-fitting, refurbishment or upgrading activities without refuelling				98		
H. Nuclear regulatory requirements					3	
J. Grid limitation, failure or grid unavailability					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	42
L. Human factor related					19	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						5
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			286			6
Z. Others					20	
Subtotal	1098	1607	286	959	401	55
Total		2991			1415	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	32	6
13. Reactor Auxiliary Systems		18
14. Safety Systems		2
15. Reactor Cooling Systems		20
16. Steam generation systems		122
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities	30	3
31. Turbine and auxiliaries	1373	25
32. Feedwater and Main Steam System		14
41. Main Generator Systems	14	32
42. Electrical Power Supply Systems	147	13
XX. Miscellaneous Systems	11	2
Total	1607	257

FR-22 DAMPIERRE-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 890.0 MW(e)
Design Net Capacity: 890.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6357.0 GW(e).h
Energy Availability Factor: 83.9%
Load Factor: 81.5%
Operating Factor: 85.7%
Energy Unavailability Factor: 16.1%
Total Off-line Time: 1249 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	662.4	595.3	651.6	627.3	21.6	236.9	601.8	522.7	570.0	647.9	618.8	600.8	6357.0
EAF (%)	99.9	99.9	99.7	99.2	3.4	37.0	96.1	88.4	95.1	99.5	99.7	90.8	83.9
UCF (%)	100.0	100.0	99.8	99.6	6.6	37.3	98.0	88.8	99.2	99.8	99.8	90.8	84.8
LF (%)	100.0	99.5	98.5	97.9	3.3	37.0	90.9	78.9	88.9	97.7	96.6	90.7	81.5
OF (%)	100.0	100.0	100.0	100.0	3.5	42.6	100.0	92.7	100.0	100.0	100.0	91.4	85.7
EUf (%)	0.1	0.1	0.3	0.8	96.6	63.0	3.9	11.6	4.9	0.5	0.3	9.2	16.1
PUF (%)	0.0	0.0	0.0	0.1	80.7	5.2	0.0	0.1	0.2	0.0	0.1	0.0	7.3
UCLF (%)	0.0	0.0	0.2	0.3	12.7	57.5	2.1	11.1	0.7	0.2	0.1	9.1	7.8
XUF (%)	0.0	0.0	0.1	0.4	3.2	0.3	1.8	0.4	4.0	0.3	0.1	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 02 Jan 1975
Date of First Criticality: 15/03/1980
Date of Grid Connection: 23/03/1980
Date of Commercial Operation: 09 Oct 1980

Lifetime Generation: 170086.7 GW(e).h
Cumulative Energy Availability Factor: 76.3%
Cumulative Load Factor: 71.5%
Cumulative Unit Capability Factor: 77.5%
Cumulative Energy Unavailability Factor: 23.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	1822.0	898	61.9	61.9	61.9	61.9	69.1	69.1	2141	73.1
1981	4322.1	900	55.9	57.4	55.9	57.4	54.8	58.4	5270	60.2
1982	5043.9	890	65.6	60.9	65.6	60.9	64.7	61.1	5994	68.4
1983	6263.0	890	85.9	68.3	85.9	68.3	80.3	66.8	7847	89.6
1984	5391.0	890	73.6	69.6	73.6	69.6	69.0	67.3	6777	77.2
1985	5738.5	890	80.9	71.7	80.6	71.6	73.6	68.5	7223	82.5
1986	5157.4	890	75.9	72.3	75.7	72.3	66.2	68.1	6673	76.2
1987	4780.2	890	67.9	71.7	65.9	71.4	61.3	67.2	6245	71.3
1988	3920.0	890	61.2	70.5	59.6	70.0	50.1	65.2	5239	59.6
1989	6467.6	890	98.6	73.5	97.9	73.0	83.0	67.1	8207	93.7
1990	2187.1	890	36.3	69.9	34.0	69.2	28.1	63.3	3110	35.5
1991	6390.9	890	82.2	71.0	81.8	70.3	82.0	64.9	7305	83.4
1992	6305.1	890	81.7	71.9	80.7	71.2	80.7	66.2	7293	83.0
1993	6702.8	890	86.6	73.0	86.4	72.3	86.0	67.7	7676	87.6
1994	5299.2	890	69.7	72.7	68.9	72.1	68.0	67.7	6185	70.6
1995	6194.0	890	84.4	73.5	82.9	72.8	79.4	68.5	7413	84.6
1996	5895.5	890	83.1	74.1	82.2	73.3	75.4	68.9	7378	84.0
1997	5172.1	890	72.3	74.0	71.9	73.3	66.3	68.8	6465	73.8
1998	6042.7	890	81.9	74.4	80.5	73.7	77.5	69.2	7294	83.3
1999	5492.4	890	76.8	74.5	75.3	73.7	70.4	69.3	6815	77.8
2000	6153.8	890	87.0	75.1	85.4	74.3	78.7	69.8	7676	87.4
2001	4125.1	890	56.8	74.3	56.7	73.5	52.9	69.0	5152	58.8
2002	6249.6	890	87.6	74.9	86.8	74.1	80.2	69.5	7586	86.6
2003	5733.3	890	78.3	75.0	76.8	74.2	73.5	69.6	6964	79.5
2004	6091.2	890	89.7	75.6	89.3	74.8	77.9	70.0	7840	89.3
2005	5838.8	890	85.2	76.0	82.8	75.1	74.9	70.2	7554	86.2
2006	6615.1	890	91.2	76.6	88.6	75.7	84.8	70.7	8077	92.2
2007	6050.0	890	82.6	76.8	80.7	75.8	77.6	71.0	7329	83.7
2008	6545.3	890	90.7	77.3	89.7	76.3	83.7	71.4	8051	91.7
2009	4973.2	890	77.6	77.3	66.7	76.0	63.8	71.2	6048	69.0
2010	6357.0	890	84.8	77.5	83.9	76.3	81.5	71.5	7511	85.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		141			287	
B. Refuelling without a maintenance	600			38	6	
C. Inspection, maintenance or repair combined with refuelling				1058	34	
D. Inspection, maintenance or repair without refuelling				60	0	
E. Testing of plant systems or components				2	1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					143	39
L. Human factor related					26	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			24			27
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		48				1
Z. Others		459			16	
Subtotal	600	648	24	1158	513	67
Total		1272			1738	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		37
13. Reactor Auxiliary Systems		13
14. Safety Systems		11
15. Reactor Cooling Systems		42
16. Steam generation systems		49
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	76	13
32. Feedwater and Main Steam System		27
33. Circulating Water System		0
35. All other I&C Systems		0
41. Main Generator Systems		56
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems	65	4
Total	141	263

FR-29 DAMPIERRE-2

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 890.0 MW(e)
 Design Net Capacity: 890.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5399.8 GW(e).h
 Energy Availability Factor: 71.2%
 Load Factor: 69.3%
 Operating Factor: 74.1%
 Energy Unavailability Factor: 28.8%
 Total Off-line Time: 2269 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	613.6	229.4	0.0	0.0	273.5	520.7	617.9	612.7	596.4	652.0	623.6	660.0	5399.8
EAF (%)	92.7	39.4	0.0	0.0	41.4	85.8	97.9	99.0	96.3	99.1	99.6	99.7	71.2
UCF (%)	99.7	44.4	0.0	0.0	41.5	88.3	98.8	99.6	99.1	99.5	99.7	99.7	72.8
LF (%)	92.7	38.4	0.0	0.0	41.3	81.3	93.3	92.5	93.1	98.3	97.3	99.7	69.3
OF (%)	100.0	47.2	0.0	0.0	49.1	90.0	100.0	100.0	100.0	100.0	100.0	100.0	74.1
EUf (%)	7.3	60.6	100.0	100.0	58.6	14.2	2.1	1.0	3.7	0.9	0.4	0.3	28.8
PUF (%)	0.2	32.8	100.0	13.1	7.6	0.3	0.9	0.2	0.7	0.4	0.3	0.3	13.0
UCLF (%)	0.1	22.8	0.0	86.9	51.0	11.4	0.3	0.2	0.2	0.1	0.0	0.0	14.2
XUF (%)	7.0	5.1	0.0	0.0	0.1	2.5	1.0	0.7	2.8	0.3	0.1	0.0	1.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 04 Jan 1975
 Date of First Criticality: 12 May 1980
 Date of Grid Connection: 12 Oct 1980
 Date of Commercial Operation: 16/02/1981

Lifetime Generation: 162837.7 GW(e).h
 Cumulative Energy Availability Factor: 77.2%
 Cumulative Load Factor: 69.6%
 Cumulative Unit Capability Factor: 78.9%
 Cumulative Energy Unavailability Factor: 22.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	5465.3	900	77.3	77.3	77.3	77.3	75.8	75.8	6670	83.2
1982	4110.8	890	53.0	64.7	53.0	64.7	52.7	63.8	4848	55.3
1983	5191.0	890	67.7	65.7	67.7	65.7	66.6	64.7	6139	70.1
1984	5781.0	890	76.1	68.4	76.1	68.4	73.9	67.1	6884	78.4
1985	6056.9	890	84.5	71.6	84.3	71.6	77.7	69.2	7400	84.5
1986	5658.5	890	82.2	73.4	82.0	73.3	72.6	69.8	6983	79.7
1987	4856.0	890	78.8	74.2	76.4	73.8	62.3	68.7	5715	65.2
1988	4583.0	890	95.1	76.8	92.4	76.1	58.6	67.4	6153	70.0
1989	5485.3	890	79.7	77.2	77.0	76.2	70.4	67.8	6927	79.1
1990	4869.5	890	69.9	76.4	67.8	75.4	62.5	67.2	6292	71.8
1991	4201.9	890	67.6	75.6	63.3	74.3	53.9	66.0	5407	61.7
1992	5049.8	890	75.9	75.6	74.7	74.3	64.6	65.9	6429	73.2
1993	5976.6	890	87.4	76.6	79.6	74.7	76.7	66.7	7625	87.0
1994	4445.0	890	84.8	77.1	84.8	75.4	57.0	66.0	5328	60.8
1995	5562.0	890	95.5	78.4	95.0	76.8	71.3	66.4	6952	79.4
1996	5761.0	890	84.2	78.7	81.5	77.0	73.7	66.8	7437	84.7
1997	4966.6	890	69.3	78.2	67.5	76.5	63.7	66.7	6204	70.8
1998	5855.9	890	80.3	78.3	78.3	76.6	75.1	67.1	7192	82.1
1999	5312.9	890	72.6	78.0	69.2	76.2	68.1	67.2	6688	76.3
2000	5866.1	890	77.6	78.0	76.0	76.2	75.0	67.6	7121	81.1
2001	5355.9	890	75.1	77.8	72.4	76.0	68.7	67.6	6593	75.3
2002	4307.5	890	56.3	76.9	56.0	75.1	55.3	67.1	5196	59.3
2003	6268.3	890	81.4	77.1	81.3	75.4	80.4	67.7	7631	87.1
2004	5983.9	890	95.7	77.8	93.7	76.1	76.5	68.0	7286	82.9
2005	5255.3	890	76.3	77.8	75.8	76.1	67.4	68.0	6719	76.7
2006	5880.5	890	85.5	78.1	83.2	76.4	75.4	68.3	7371	84.1
2007	6582.7	890	91.7	78.6	88.9	76.9	84.4	68.9	8201	93.6
2008	6014.9	890	84.0	78.8	82.1	77.0	76.9	69.2	7462	84.9
2009	6455.3	890	89.5	79.1	86.6	77.4	82.8	69.6	7902	90.2
2010	5399.8	890	72.8	78.9	71.2	77.2	69.3	69.6	6491	74.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		72			302	
B. Refuelling without a maintenance				44	4	
C. Inspection, maintenance or repair combined with refuelling	1054			1006	15	
D. Inspection, maintenance or repair without refuelling				75		
E. Testing of plant systems or components				4	0	
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability					1	0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					86	21
L. Human factor related					14	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						0
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		96				
Z. Others		1047			16	
Subtotal	1054	1215	0	1129	442	21
Total		2269			1592	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		14
14. Safety Systems	72	22
15. Reactor Cooling Systems		43
16. Steam generation systems		28
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries		59
32. Feedwater and Main Steam System		12
35. All other I&C Systems		0
41. Main Generator Systems		37
42. Electrical Power Supply Systems		26
XX. Miscellaneous Systems		3
Total	72	260

FR-30 DAMPIERRE-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 890.0 MW(e)
Design Net Capacity: 890.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6642.9 GW(e).h
Energy Availability Factor: 86.3%
Load Factor: 85.2%
Operating Factor: 87.4%
Energy Unavailability Factor: 13.7%
Total Off-line Time: 1100 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	599.1	586.8	494.5	628.4	650.4	622.8	637.5	271.7	242.1	645.2	611.3	653.0	6642.9
EAF (%)	90.4	99.6	74.6	99.8	99.4	98.2	97.5	41.2	37.8	98.7	99.8	99.8	86.3
UCF (%)	90.4	99.6	74.6	99.9	99.7	99.4	99.3	41.8	41.2	99.8	99.9	99.8	87.0
LF (%)	90.5	98.1	74.8	98.1	98.2	97.2	96.3	41.0	37.8	97.3	95.4	98.6	85.2
OF (%)	91.0	100.0	75.4	100.0	100.0	100.0	100.0	42.1	41.8	100.0	100.0	100.0	87.4
EUf (%)	9.6	0.4	25.4	0.2	0.6	1.8	2.5	58.8	62.2	1.3	0.2	0.2	13.7
PUF (%)	0.1	0.0	0.0	0.0	0.0	0.1	0.0	58.0	25.7	0.0	0.0	0.2	7.1
UCLF (%)	9.6	0.4	25.4	0.1	0.3	0.5	0.7	0.3	33.1	0.2	0.1	0.0	5.9
XUF (%)	0.0	0.0	0.0	0.1	0.3	1.2	1.8	0.6	3.3	1.1	0.1	0.0	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 09 Jan 1975
Date of First Criticality: 25/01/1981
Date of Grid Connection: 30/01/1981
Date of Commercial Operation: 27/05/1981

Lifetime Generation: 170149.8 GW(e).h
Cumulative Energy Availability Factor: 77.7%
Cumulative Load Factor: 73.1%
Cumulative Unit Capability Factor: 79.3%
Cumulative Energy Unavailability Factor: 22.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]	Cumul.	Factor [%]	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	4043.7	900	78.0	78.0	78.0	78.0	76.4	76.4	4789	81.4
1982	3767.6	890	48.7	60.6	48.7	60.6	48.3	59.7	4632	52.9
1983	5517.0	890	72.7	65.1	72.7	65.1	70.8	63.8	6638	75.8
1984	6206.0	890	79.7	69.1	79.7	69.1	79.4	68.1	7121	81.1
1985	6364.4	890	85.1	72.5	84.9	72.4	81.6	71.0	7523	85.9
1986	6717.2	890	99.9	77.3	99.5	77.2	86.2	73.6	8330	95.1
1987	5019.5	890	82.4	78.1	79.3	77.5	64.4	72.2	6269	71.6
1988	4964.0	890	72.9	77.4	68.5	76.4	63.5	71.1	6435	73.3
1989	5912.9	890	82.2	77.9	78.4	76.6	75.8	71.7	7242	82.7
1990	5996.5	890	82.5	78.4	79.8	76.9	76.9	72.2	7348	83.9
1991	5124.1	890	70.0	77.6	69.6	76.2	65.7	71.6	6244	71.3
1992	4875.1	890	65.5	76.6	65.5	75.3	62.4	70.8	5814	66.2
1993	6148.8	890	82.8	77.1	82.8	75.9	78.9	71.4	7333	83.7
1994	5537.6	890	86.2	77.7	82.7	76.4	71.0	71.4	7013	80.1
1995	4773.5	890	83.4	78.1	80.2	76.7	61.2	70.7	6343	72.4
1996	5575.1	890	77.6	78.1	77.1	76.7	71.3	70.7	6940	79.0
1997	5720.9	890	81.0	78.3	78.3	76.8	73.4	70.9	7211	82.3
1998	5905.8	890	82.7	78.5	81.4	77.0	75.8	71.2	7210	82.3
1999	5779.4	890	80.9	78.7	78.2	77.1	74.1	71.3	7186	82.0
2000	4308.3	890	59.8	77.7	57.6	76.1	55.1	70.5	5378	61.2
2001	5993.0	890	77.8	77.7	77.4	76.2	76.9	70.8	7060	80.6
2002	5929.8	890	77.4	77.7	76.8	76.2	76.1	71.1	6877	78.5
2003	5346.9	890	69.0	77.3	68.9	75.9	68.6	71.0	6152	70.2
2004	6867.2	890	89.3	77.8	88.0	76.4	87.8	71.7	7920	90.2
2005	6242.4	890	86.5	78.2	84.1	76.7	80.1	72.0	7627	87.1
2006	6228.5	890	92.3	78.7	89.3	77.2	79.9	72.3	7991	91.2
2007	5614.1	890	78.7	78.7	76.0	77.2	72.0	72.3	6928	79.1
2008	6725.6	890	91.5	79.2	90.0	77.6	86.0	72.8	8100	92.2
2009	5365.0	890	74.8	79.0	71.0	77.4	68.8	72.7	6486	74.0
2010	6642.9	890	87.0	79.3	86.3	77.7	85.2	73.1	7660	87.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		251			275	
B. Refuelling without a maintenance	588			20	13	
C. Inspection, maintenance or repair combined with refuelling				1141	9	
D. Inspection, maintenance or repair without refuelling				28	1	
E. Testing of plant systems or components	0			5	0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					68	2
L. Human factor related					8	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			24			4
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		48				1
Z. Others		190			35	
Subtotal	588	489	24	1194	409	7
Total		1101			1610	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		8
14. Safety Systems		38
15. Reactor Cooling Systems		63
16. Steam generation systems		45
31. Turbine and auxiliaries	184	27
32. Feedwater and Main Steam System		9
33. Circulating Water System		1
35. All other I&C Systems		2
41. Main Generator Systems	67	29
42. Electrical Power Supply Systems		19
XX. Miscellaneous Systems		3
Total	251	248

FR-31 DAMPIERRE-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 890.0 MW(e)
 Design Net Capacity: 890.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6472.4 GW(e).h
 Energy Availability Factor: 82.6%
 Load Factor: 83.0%
 Operating Factor: 83.8%
 Energy Unavailability Factor: 17.4%
 Total Off-line Time: 1416 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	669.9	601.6	665.3	644.3	656.1	81.7	0.0	555.2	632.4	656.9	640.7	668.4	6472.4
EAF (%)	99.9	100.0	99.8	99.9	98.9	12.8	0.0	83.9	98.7	99.0	99.5	99.9	82.6
UCF (%)	99.9	100.0	99.8	100.0	99.9	13.3	3.1	85.0	99.4	99.4	99.7	99.9	83.2
LF (%)	101.2	100.6	100.6	100.5	99.1	12.8	0.0	83.8	98.7	99.1	100.0	100.9	83.0
OF (%)	100.0	100.0	100.0	100.0	100.0	13.3	0.0	93.5	100.0	100.0	100.0	100.0	83.8
EUf (%)	0.1	0.0	0.2	0.1	1.1	87.2	100.0	16.1	1.3	1.0	0.5	0.1	17.4
PUF (%)	0.1	0.0	0.2	0.0	0.1	86.7	63.1	6.2	0.2	0.3	0.1	0.1	13.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	33.8	8.9	0.4	0.3	0.3	0.0	3.7
XUF (%)	0.0	0.0	0.0	0.1	1.0	0.5	3.1	1.0	0.7	0.4	0.2	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 12 Jan 1975
 Date of First Criticality: 08 May 1981
 Date of Grid Connection: 18/08/1981
 Date of Commercial Operation: 20/11/1981

Lifetime Generation: 162688.6 GW(e).h
 Cumulative Energy Availability Factor: 76.7%
 Cumulative Load Factor: 71.4%
 Cumulative Unit Capability Factor: 78.6%
 Cumulative Energy Unavailability Factor: 23.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	1093.0	894	83.0	83.0	83.0	83.0	83.0	83.0	1300	88.8
1982	5745.6	890	81.8	82.0	81.8	82.0	73.7	75.0	7413	84.6
1983	4156.0	890	57.6	70.7	57.6	70.7	53.3	65.0	5207	59.4
1984	6276.0	890	85.1	75.3	85.1	75.3	80.3	69.8	7765	88.4
1985	5859.9	890	83.5	77.2	78.9	76.2	75.2	71.1	7387	84.3
1986	6664.9	890	88.8	79.5	88.5	78.5	85.5	73.9	7862	89.7
1987	5447.8	890	78.4	79.3	78.1	78.5	69.9	73.2	6795	77.6
1988	5086.0	890	82.9	79.8	79.9	78.7	65.1	72.1	6645	75.6
1989	5392.4	890	73.7	79.1	72.9	78.0	69.2	71.7	6621	75.6
1990	5153.0	890	91.2	80.4	87.3	79.0	66.1	71.1	6792	77.5
1991	6062.8	890	88.3	81.2	86.7	79.7	77.8	71.8	7612	86.9
1992	5331.5	890	76.7	80.8	74.5	79.3	68.2	71.5	6832	77.8
1993	4827.7	890	69.2	79.8	63.4	78.0	61.9	70.7	6103	69.7
1994	5264.0	890	80.7	79.9	79.5	78.1	67.5	70.4	7103	81.1
1995	5488.0	890	78.8	79.8	75.4	77.9	70.4	70.4	6997	79.9
1996	6118.5	890	83.7	80.1	82.9	78.2	78.3	70.9	7596	86.5
1997	5918.6	890	80.9	80.1	80.5	78.4	75.9	71.3	7178	81.9
1998	4506.5	890	60.6	79.0	59.0	77.2	57.8	70.5	5435	62.0
1999	4642.5	890	64.8	78.2	64.1	76.5	59.5	69.9	5770	65.9
2000	5598.7	890	76.0	78.1	75.2	76.4	71.6	70.0	6752	76.9
2001	5361.8	890	70.9	77.7	70.1	76.1	68.8	69.9	6422	73.3
2002	6134.5	890	85.3	78.1	83.8	76.5	78.7	70.3	7576	86.5
2003	5547.4	890	77.4	78.1	73.4	76.3	71.2	70.4	6759	77.2
2004	4531.8	890	61.3	77.3	59.4	75.6	58.0	69.8	5551	63.2
2005	6566.9	890	88.7	77.8	87.6	76.1	84.2	70.4	7956	90.8
2006	5905.4	890	85.8	78.1	83.6	76.4	75.7	70.6	7428	84.8
2007	5763.5	890	88.1	78.5	83.5	76.7	73.9	70.8	7384	84.3
2008	5249.1	890	68.8	78.1	67.5	76.3	67.1	70.6	6317	71.9
2009	6259.1	890	86.3	78.4	80.2	76.5	80.3	71.0	7151	81.6
2010	6472.4	890	83.2	78.6	82.6	76.7	83.0	71.4	7344	83.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					438	
B. Refuelling without a maintenance				44	1	
C. Inspection, maintenance or repair combined with refuelling	1093			998	28	
D. Inspection, maintenance or repair without refuelling				5		
E. Testing of plant systems or components				5	1	
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					72	24
L. Human factor related					11	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						7
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			23			16
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		96				
Z. Others		216			25	
Subtotal	1093	312	23	1052	577	47
Total		1428			1676	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		51
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		52
14. Safety Systems		7
15. Reactor Cooling Systems		8
16. Steam generation systems		103
31. Turbine and auxiliaries		30
32. Feedwater and Main Steam System		28
33. Circulating Water System		1
41. Main Generator Systems		88
42. Electrical Power Supply Systems		4
XX. Miscellaneous Systems		2
Total	0	378

FR-11 FESSENHEIM-1

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 880.0 MW(e)
Design Net Capacity: 880.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5181.5 GW(e).h
Energy Availability Factor: 68.0%
Load Factor: 67.2%
Operating Factor: 70.9%
Energy Unavailability Factor: 32.0%
Total Off-line Time: 2551 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	80.8	584.3	555.3	595.4	460.2	623.2	616.3	402.2	620.1	643.7	5181.5
EAF (%)	0.0	0.0	12.4	92.5	85.2	95.1	72.5	97.3	98.9	62.2	98.2	98.7	68.0
UCF (%)	0.0	0.0	12.4	92.5	85.2	96.2	72.5	97.3	98.9	62.2	98.2	98.7	68.1
LF (%)	0.0	0.0	12.4	92.2	84.8	94.0	70.3	95.2	97.3	61.3	97.9	98.3	67.2
OF (%)	0.0	0.0	23.0	94.3	88.7	100.0	76.2	100.0	100.0	65.0	100.0	100.0	70.9
EUAF (%)	100.0	100.0	87.6	7.5	14.8	4.9	27.5	2.7	1.1	37.8	1.8	1.3	32.0
PUF (%)	48.4	0.0	7.5	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8
UCLF (%)	51.6	100.0	80.1	7.4	14.3	3.8	27.5	2.7	1.1	37.8	1.8	1.3	27.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 09 Jan 1971 **Lifetime Generation:** 172389.6 GW(e).h
Date of First Criticality: 03 Jul 1977 **Cumulative Energy Availability Factor:** 70.6%
Date of Grid Connection: 04 Jun 1977 **Cumulative Load Factor:** 67.4%
Date of Commercial Operation: 01 Jan 1978 **Cumulative Unit Capability Factor:** 71.8%
Cumulative Energy Unavailability Factor: 29.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	6079.2	890	78.2	78.2	78.2	78.2	78.0	78.0	7302	83.4
1979	4542.0	890	58.8	68.5	58.8	68.5	58.3	68.1	5338	60.9
1980	5510.0	890	70.7	69.2	70.7	69.2	70.5	68.9	6350	72.3
1981	5065.3	890	65.3	68.2	65.3	68.2	65.0	67.9	5844	66.7
1982	1848.2	880	24.0	59.5	24.0	59.5	24.0	59.2	2138	24.4
1983	5690.0	880	75.3	62.1	75.3	62.1	73.8	61.6	6701	76.5
1984	6503.0	880	85.2	65.4	85.2	65.4	84.1	64.8	7731	88.0
1985	6044.6	880	80.4	67.2	79.8	67.2	78.4	66.5	7105	81.1
1986	5661.3	880	75.1	68.1	74.7	68.0	73.4	67.3	6702	76.5
1987	5029.6	880	74.1	68.7	73.6	68.6	65.2	67.1	6147	70.2
1988	5399.0	880	86.5	70.3	77.9	69.4	69.8	67.3	7069	80.5
1989	3253.3	880	46.1	68.3	43.4	67.3	42.2	65.2	4108	46.9
1990	5036.7	880	79.6	69.2	74.6	67.8	65.3	65.3	6481	74.0
1991	4053.5	880	55.7	68.2	55.5	66.9	52.6	64.4	4900	55.9
1992	4867.1	880	67.2	68.2	66.9	66.9	63.0	64.3	6079	69.2
1993	5548.7	880	81.0	68.9	74.6	67.4	72.0	64.7	7161	81.7
1994	6186.1	880	87.4	70.0	86.5	68.5	80.2	65.6	7508	85.7
1995	5856.1	880	85.5	70.9	84.7	69.4	76.0	66.2	6990	79.8
1996	6165.0	880	85.3	71.6	85.2	70.3	79.8	66.9	7544	85.9
1997	5826.8	880	81.6	72.1	81.5	70.8	75.6	67.4	7209	82.3
1998	4617.1	880	64.3	71.8	61.7	70.4	59.9	67.0	5727	65.4
1999	5228.8	880	71.2	71.7	70.8	70.4	67.8	67.0	6283	71.7
2000	5782.6	880	81.1	72.1	80.8	70.9	74.8	67.4	7145	81.3
2001	5507.5	880	79.6	72.5	78.4	71.2	71.4	67.6	7095	81.0
2002	2989.7	880	42.9	71.3	41.1	70.0	38.8	66.4	3832	43.7
2003	6985.2	880	98.2	72.3	96.5	71.0	90.6	67.3	8518	97.2
2004	3726.5	880	50.2	71.5	49.6	70.2	48.2	66.6	4500	51.2
2005	5448.4	880	75.4	71.6	75.3	70.4	70.7	66.8	6673	76.2
2006	6875.7	880	94.1	72.4	93.5	71.2	89.2	67.5	8338	95.2
2007	4667.0	880	63.2	72.1	61.1	70.8	60.5	67.3	5715	65.2
2008	5147.4	880	67.9	72.0	66.8	70.7	66.6	67.3	6120	69.7
2009	5382.8	880	71.4	71.9	70.1	70.7	69.8	67.4	6365	72.7
2010	5181.5	880	68.1	71.8	68.0	70.6	67.2	67.4	6209	70.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2203			730	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	360			1213	11	
D. Inspection, maintenance or repair without refuelling				49	9	
E. Testing of plant systems or components				15	0	
H. Nuclear regulatory requirements					53	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	4
L. Human factor related					94	
Z. Others					2	
Subtotal	360	2203	0	1277	907	4
Total		2563			2188	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	144	294
12. Reactor I&C Systems	219	28
13. Reactor Auxiliary Systems	24	9
14. Safety Systems	42	54
15. Reactor Cooling Systems	202	54
16. Steam generation systems		29
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries	140	93
32. Feedwater and Main Steam System		29
33. Circulating Water System		0
35. All other I&C Systems	88	1
41. Main Generator Systems	915	79
42. Electrical Power Supply Systems	69	9
XX. Miscellaneous Systems	360	16
Total	2203	696

FR-12 FESSENHEIM-2

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP at the beginning of 2010): 880.0 MW(e)
 Design Net Capacity: 880.0 MW(e)
 Design Discharge Burnup: 44000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6573.1 GW(e).h
 Energy Availability Factor: 87.0%
 Load Factor: 85.3%
 Operating Factor: 92.5%
 Energy Unavailability Factor: 13.0%
 Total Off-line Time: 660 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	423.2	550.2	550.3	563.8	607.5	594.9	591.9	601.8	269.2	584.5	607.4	628.3	6573.1
EAF (%)	65.2	94.9	85.7	90.5	94.9	96.9	95.4	94.5	43.3	90.0	96.5	96.6	87.0
UCF (%)	98.3	94.9	85.7	90.5	94.9	96.9	95.4	94.5	43.3	90.0	96.5	96.6	89.8
LF (%)	64.6	93.0	84.2	89.0	92.8	93.9	90.4	91.9	42.5	89.2	95.9	96.0	85.3
OF (%)	68.5	100.0	100.0	100.0	100.0	100.0	99.6	100.0	46.0	95.4	100.0	100.0	92.5
EUAF (%)	34.8	5.1	14.3	9.5	5.1	3.1	4.6	5.5	56.7	10.0	3.5	3.4	13.0
PUF (%)	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
UCLF (%)	0.4	5.1	14.3	9.6	5.1	3.1	4.6	5.5	56.7	10.0	3.5	3.4	10.0
XUF (%)	33.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 02 Jan 1972 Lifetime Generation: 177660.3 GW(e).h
 Date of First Criticality: 27/06/1977 Cumulative Energy Availability Factor: 74.0%
 Date of Grid Connection: 10 Jul 1977 Cumulative Load Factor: 69.8%
 Date of Commercial Operation: 04 Jan 1978 Cumulative Unit Capability Factor: 75.0%
 Cumulative Energy Unavailability Factor: 26.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	4785.8	890	82.7	82.7	81.8	81.8	81.5	81.5	5648	85.6
1979	4521.0	890	58.7	69.0	58.7	68.6	58.0	68.1	5684	64.9
1980	5601.0	890	72.2	70.2	72.2	69.9	71.6	69.4	6603	75.2
1981	6055.0	890	79.4	72.6	79.4	72.5	77.7	71.6	7117	81.2
1982	6047.9	880	93.1	76.9	93.1	76.8	78.5	73.0	8247	94.1
1983	4315.0	880	58.2	73.7	58.2	73.6	56.0	70.1	5206	59.4
1984	6459.0	880	88.4	75.9	88.4	75.8	83.6	72.1	7860	89.5
1985	5917.2	880	80.0	76.4	78.6	76.1	76.8	72.7	7248	82.7
1986	5522.5	880	73.4	76.1	73.2	75.8	71.6	72.5	6573	75.0
1987	6150.1	880	83.6	76.8	82.6	76.5	79.8	73.3	7335	83.7
1988	4830.0	880	72.4	76.4	69.8	75.9	62.5	72.3	6158	70.1
1989	5643.4	880	97.0	78.2	96.2	77.6	73.2	72.4	6944	79.3
1990	3552.4	880	52.0	76.1	49.6	75.4	46.1	70.3	4612	52.6
1991	5308.4	880	73.3	75.9	72.8	75.2	68.9	70.2	6537	74.6
1992	2202.0	880	29.9	72.8	29.9	72.1	28.5	67.4	2699	30.7
1993	5775.1	880	81.0	73.3	77.6	72.5	74.9	67.9	7167	81.8
1994	5294.9	880	98.5	74.8	98.2	74.0	68.7	67.9	6807	77.7
1995	5098.3	880	71.5	74.6	70.5	73.8	66.1	67.8	6305	72.0
1996	6192.1	880	84.9	75.2	84.4	74.4	80.1	68.5	7515	85.6
1997	5808.6	880	80.6	75.5	80.0	74.7	75.3	68.8	6982	79.7
1998	5597.0	880	75.9	75.5	73.7	74.6	72.6	69.0	6797	77.6
1999	6392.6	880	87.1	76.0	86.4	75.2	82.9	69.6	7708	88.0
2000	3730.4	880	51.4	74.9	51.1	74.1	48.3	68.7	4514	51.4
2001	6699.9	880	88.6	75.5	87.3	74.7	86.9	69.5	7876	89.9
2002	6562.6	880	87.1	76.0	85.6	75.1	85.1	70.1	7729	88.2
2003	4589.5	880	60.7	75.4	60.7	74.5	59.5	69.7	5434	62.0
2004	6913.7	880	94.5	76.1	93.6	75.3	89.4	70.4	8435	96.0
2005	6381.2	880	87.6	76.5	85.1	75.6	82.8	70.9	7813	89.2
2006	4803.1	880	64.7	76.1	64.7	75.2	62.3	70.6	5844	66.7
2007	4816.7	880	64.5	75.7	62.9	74.8	62.5	70.3	5781	66.0
2008	5131.4	880	68.5	75.5	66.8	74.6	66.4	70.2	6384	72.7
2009	3366.6	880	47.1	74.6	43.9	73.6	43.7	69.3	4206	48.0
2010	6573.1	880	89.8	75.0	87.0	74.0	85.3	69.8	8100	92.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		427			663	3
B. Refuelling without a maintenance				22	1	
C. Inspection, maintenance or repair combined with refuelling				1149	6	
D. Inspection, maintenance or repair without refuelling				53		
E. Testing of plant systems or components				21	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				1		
H. Nuclear regulatory requirements					17	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	27
L. Human factor related					12	0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			264			3
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						2
Z. Others					10	
Subtotal	0	427	264	1246	715	35
Total		691			1996	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		51
12. Reactor I&C Systems	389	21
13. Reactor Auxiliary Systems		25
14. Safety Systems		25
15. Reactor Cooling Systems		29
16. Steam generation systems		192
21. Fuel Handling and Storage Facilities		8
31. Turbine and auxiliaries		60
32. Feedwater and Main Steam System		59
33. Circulating Water System		4
41. Main Generator Systems	34	62
42. Electrical Power Supply Systems		5
XX. Miscellaneous Systems	4	51
Total	427	592

FR-46 FLAMANVILLE-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1330.0 MW(e)
Design Net Capacity: 1330.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8519.7 GW(e).h
Energy Availability Factor: 75.8%
Load Factor: 73.1%
Operating Factor: 79.4%
Energy Unavailability Factor: 24.2%
Total Off-line Time: 1805 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1.0	788.2	449.5	149.6	915.6	823.0	941.8	852.4	869.8	836.3	922.3	970.1	8519.7
EAF (%)	0.2	89.2	46.6	16.4	97.5	91.6	99.5	91.1	95.4	85.4	98.8	98.9	75.8
UCF (%)	0.2	89.2	46.8	16.4	99.4	95.8	99.5	92.2	99.6	95.0	99.1	98.9	77.6
LF (%)	0.1	88.2	45.5	15.6	92.5	85.9	95.2	86.1	90.8	84.4	96.3	98.0	73.1
OF (%)	5.4	100.0	47.2	17.2	100.0	95.4	100.0	92.9	100.0	96.4	100.0	100.0	79.4
EUf (%)	99.8	10.8	53.4	83.6	2.5	8.4	0.5	8.9	4.6	14.6	1.2	1.1	24.2
PUF (%)	5.2	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
UCLF (%)	94.6	1.0	53.2	83.6	0.6	4.2	0.5	7.8	0.4	5.0	0.9	1.1	21.2
XUF (%)	0.0	0.0	0.2	0.0	1.9	4.2	0.0	1.1	4.2	9.6	0.3	0.0	1.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 12 Jan 1979
Date of First Criticality: 29/09/1985
Date of Grid Connection: 12 Apr 1985
Date of Commercial Operation: 12 Jan 1986

Lifetime Generation: 195883.8 GW(e).h
Cumulative Energy Availability Factor: 73.2%
Cumulative Load Factor: 68.4%
Cumulative Unit Capability Factor: 75.8%
Cumulative Energy Unavailability Factor: 26.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	965.9	1290	97.3	97.3	97.3	97.3	100.6	100.6	726	97.6
1987	7150.8	1290	63.2	65.9	62.2	64.9	63.3	66.2	5656	64.6
1988	7175.0	1330	67.4	66.6	66.0	65.5	61.4	63.9	5757	65.5
1989	8775.2	1330	81.0	71.3	80.6	70.4	75.3	67.6	7146	81.6
1990	7090.0	1330	67.0	70.3	65.7	69.2	60.9	65.9	6360	72.6
1991	5882.9	1330	68.4	69.9	59.4	67.3	50.5	62.9	5481	62.6
1992	7606.8	1330	66.2	69.3	66.2	67.1	65.1	63.3	5901	67.2
1993	9301.8	1330	96.8	73.2	87.2	70.0	79.8	65.6	7936	90.6
1994	7145.8	1330	80.1	74.0	75.3	70.6	61.3	65.1	6515	74.4
1995	7665.1	1330	77.4	74.4	73.2	70.9	65.8	65.2	6654	76.0
1996	8598.3	1330	84.6	75.4	77.8	71.6	73.6	66.0	7050	80.3
1997	6853.9	1330	63.9	74.4	62.3	70.8	58.8	65.3	5529	63.1
1998	9469.4	1330	86.7	75.4	86.7	72.1	81.3	66.7	7855	89.7
1999	6979.4	1330	66.1	74.7	64.4	71.5	59.9	66.2	5906	67.4
2000	8035.3	1330	75.6	74.8	74.5	71.7	68.8	66.3	6607	75.2
2001	10038.5	1330	92.6	75.9	92.5	73.1	86.2	67.7	8126	92.8
2002	8141.8	1330	75.5	75.9	73.1	73.1	69.9	67.8	6736	76.9
2003	7510.8	1330	68.2	75.5	67.8	72.8	64.5	67.6	6090	69.5
2004	10630.0	1330	98.2	76.7	96.8	74.1	91.0	68.9	8668	98.7
2005	9099.9	1330	85.6	77.2	83.3	74.6	78.1	69.4	7627	87.1
2006	7790.9	1330	72.5	77.0	69.1	74.3	66.9	69.3	6675	76.2
2007	9595.6	1330	90.5	77.6	89.0	75.0	82.4	69.9	8041	91.8
2008	4962.4	1330	43.8	76.1	42.9	73.6	42.5	68.6	4018	45.7
2009	6956.7	1330	68.2	75.7	62.7	73.1	59.7	68.2	5593	63.8
2010	8519.7	1330	77.6	75.8	75.8	73.2	73.1	68.4	6955	79.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1791			826	
B. Refuelling without a maintenance				34	1	
C. Inspection, maintenance or repair combined with refuelling				925		
D. Inspection, maintenance or repair without refuelling				30		
E. Testing of plant systems or components				11	1	
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					19	30
L. Human factor related					12	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						16
Z. Others			14		4	0
Subtotal	0	1791	14	1000	863	48
Total		1805			1911	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		121
12. Reactor I&C Systems	59	37
13. Reactor Auxiliary Systems		40
14. Safety Systems		13
15. Reactor Cooling Systems		24
16. Steam generation systems	312	52
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries	107	154
32. Feedwater and Main Steam System		66
33. Circulating Water System		3
35. All other I&C Systems		1
41. Main Generator Systems	53	138
42. Electrical Power Supply Systems	1129	78
XX. Miscellaneous Systems	131	40
Total	1791	769

FR-47 FLAMANVILLE-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1330.0 MW(e)
Design Net Capacity: 1330.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7594.3 GW(e).h
Energy Availability Factor: 68.8%
Load Factor: 65.2%
Operating Factor: 72.2%
Energy Unavailability Factor: 31.2%
Total Off-line Time: 2431 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	958.3	833.6	863.1	435.8	0.0	0.0	63.8	806.7	877.9	873.6	901.6	979.9	7594.3
EAF (%)	100.0	95.7	87.5	45.5	0.0	0.0	31.2	83.8	97.3	89.5	96.6	99.9	68.8
UCF (%)	100.0	95.7	92.7	53.0	0.0	46.7	31.2	88.7	99.8	100.0	96.8	100.0	75.2
LF (%)	96.8	93.3	87.3	45.5	0.0	0.0	6.5	81.5	91.7	88.2	94.1	99.0	65.2
OF (%)	100.0	100.0	93.9	53.5	0.0	0.0	27.8	95.7	100.0	100.0	97.5	100.0	72.2
EUf (%)	0.0	4.3	12.5	54.5	100.0	100.0	68.8	16.2	2.7	10.5	3.4	0.1	31.2
PUF (%)	0.0	0.0	0.0	47.0	100.0	43.3	7.6	4.7	0.0	0.0	0.0	0.1	17.0
UCLF (%)	0.0	4.3	7.3	0.0	0.0	10.0	61.2	6.6	0.2	0.0	3.2	0.0	7.8
XUF (%)	0.0	0.0	5.2	7.5	0.0	46.7	0.0	4.9	2.5	10.4	0.2	0.0	6.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 05 Jan 1980
Date of First Criticality: 06 Dec 1986
Date of Grid Connection: 18/07/1986
Date of Commercial Operation: 03 Sep 1987
Lifetime Generation: 197206.5 GW(e).h
Cumulative Energy Availability Factor: 76.4%
Cumulative Load Factor: 69.9%
Cumulative Unit Capability Factor: 77.8%
Cumulative Energy Unavailability Factor: 23.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	5578.8	1290	88.9	88.9	88.7	88.7	58.9	58.9	5094	69.4
1988	7106.0	1330	67.4	77.1	65.4	75.8	60.8	60.0	5674	64.6
1989	4824.5	1330	50.6	67.7	48.7	66.2	41.4	53.4	3836	43.8
1990	7819.6	1330	76.6	70.0	75.7	68.7	67.1	57.0	6392	73.0
1991	7965.7	1330	72.3	70.5	70.6	69.1	68.4	59.3	6432	73.4
1992	8842.4	1330	78.2	71.8	78.0	70.6	75.7	62.2	6962	79.3
1993	7985.2	1330	71.4	71.8	69.1	70.4	68.5	63.1	6338	72.4
1994	8384.3	1330	75.4	72.2	75.3	71.0	72.0	64.2	6711	76.6
1995	8962.4	1330	82.1	73.3	81.4	72.2	76.9	65.7	7264	82.9
1996	9387.5	1330	87.5	74.8	86.6	73.7	80.4	67.2	7685	87.5
1997	8546.0	1330	95.4	76.7	95.3	75.7	73.4	67.7	7351	83.9
1998	5656.6	1330	55.4	74.9	55.4	74.0	48.6	66.1	4880	55.7
1999	7248.9	1330	67.4	74.3	65.2	73.3	62.2	65.8	6034	68.9
2000	9907.9	1330	94.2	75.8	93.7	74.8	84.8	67.2	8122	92.5
2001	8565.1	1330	77.9	75.9	76.2	74.9	73.5	67.6	6863	78.3
2002	8502.3	1330	78.1	76.0	77.9	75.1	73.0	68.0	6839	78.1
2003	10065.3	1330	93.6	77.1	93.4	76.1	86.4	69.1	8365	95.5
2004	7499.8	1330	68.3	76.6	66.8	75.6	64.2	68.8	6125	69.7
2005	9779.1	1330	89.1	77.3	86.7	76.2	83.9	69.6	7894	90.1
2006	10125.8	1330	98.0	78.3	97.5	77.3	86.9	70.5	8438	96.3
2007	8063.0	1330	78.3	78.3	76.5	77.2	69.2	70.4	7021	80.1
2008	6140.9	1330	57.9	77.4	54.4	76.2	52.6	69.6	5052	57.5
2009	9531.8	1330	90.9	78.0	88.4	76.7	81.8	70.1	8016	91.5
2010	7594.3	1330	75.2	77.8	68.8	76.4	65.2	69.9	6329	72.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		386			637	
B. Refuelling without a maintenance				30	3	
C. Inspection, maintenance or repair combined with refuelling	1391			905	31	
D. Inspection, maintenance or repair without refuelling				92		
E. Testing of plant systems or components				22	1	0
G. Major back-fitting, refurbishment or upgrading activities without refuelling				1		
H. Nuclear regulatory requirements					19	
J. Grid limitation, failure or grid unavailability			148			2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					18	2
L. Human factor related					1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			373			
Z. Others		144			0	
Subtotal	1391	530	521	1050	710	10
Total		2442			1770	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems	24	26
13. Reactor Auxiliary Systems	18	50
14. Safety Systems		19
15. Reactor Cooling Systems	24	186
16. Steam generation systems		64
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities	48	0
31. Turbine and auxiliaries	83	82
32. Feedwater and Main Steam System		39
35. All other I&C Systems	48	
41. Main Generator Systems		55
42. Electrical Power Supply Systems	96	71
XX. Miscellaneous Systems	45	8
Total	386	611

FR-61 GOLFECH-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1310.0 MW(e)
Design Net Capacity: 1310.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8888.7 GW(e).h
Energy Availability Factor: 81.7%
Load Factor: 77.5%
Operating Factor: 83.2%
Energy Unavailability Factor: 18.3%
Total Off-line Time: 1470 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	957.4	852.0	917.8	878.1	892.5	856.1	903.0	901.0	60.9	0.0	761.5	908.5	8888.7
EAF (%)	99.6	99.5	99.1	99.2	99.2	98.7	99.1	99.2	6.9	0.0	82.1	98.2	81.7
UCF (%)	99.6	99.6	99.1	99.2	99.2	99.1	99.1	99.2	6.9	20.5	87.1	98.3	83.9
LF (%)	98.2	96.8	94.3	93.1	91.6	90.8	92.6	92.4	6.5	0.0	80.7	93.2	77.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.9	0.0	92.4	100.0	83.2
EUUF (%)	0.4	0.5	0.9	0.8	0.8	1.3	0.9	0.8	93.1	100.0	17.9	1.8	18.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.1	79.5	9.5	0.0	15.2
UCLF (%)	0.4	0.4	0.9	0.8	0.8	0.9	0.8	0.8	0.1	0.0	3.5	1.8	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	20.5	5.0	0.0	2.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 17/11/1982
Date of First Criticality: 24/04/1990
Date of Grid Connection: 06 Jul 1990
Date of Commercial Operation: 02 Jan 1991

Lifetime Generation: 175973.5 GW(e).h
Cumulative Energy Availability Factor: 82.6%
Cumulative Load Factor: 76.0%
Cumulative Unit Capability Factor: 85.4%
Cumulative Energy Unavailability Factor: 17.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1991	8871.6	1310	97.8	97.8	96.1	96.1	84.5	84.5	7608	94.9
1992	7065.9	1310	67.9	82.1	64.3	79.5	61.4	72.4	6128	69.8
1993	7925.6	1310	82.6	82.3	72.7	77.1	69.1	71.3	7143	81.5
1994	7756.1	1310	81.3	82.0	77.8	77.3	67.6	70.3	7215	82.4
1995	7897.8	1310	83.5	82.3	75.6	77.0	68.8	70.0	7005	80.0
1996	8862.4	1310	84.8	82.8	83.2	78.0	77.0	71.2	7598	86.5
1997	9151.6	1310	94.6	84.5	94.5	80.4	79.7	72.4	8000	91.3
1998	8576.6	1310	84.7	84.5	81.1	80.5	74.7	72.7	7472	85.3
1999	7926.3	1310	80.8	84.1	77.2	80.1	69.1	72.3	6837	78.0
2000	8766.3	1310	94.1	85.1	93.9	81.5	76.2	72.7	7901	89.9
2001	7511.9	1310	69.1	83.6	68.4	80.3	65.5	72.0	6147	70.2
2002	9242.4	1310	82.5	83.5	81.4	80.4	80.5	72.8	7301	83.3
2003	10342.7	1310	99.2	84.8	93.9	81.5	90.1	74.1	8252	94.2
2004	9051.1	1310	87.6	85.0	84.7	81.7	78.7	74.4	7721	87.9
2005	8653.5	1310	78.7	84.5	78.7	81.5	75.4	74.5	7014	80.1
2006	9475.1	1310	88.7	84.8	85.7	81.8	82.6	75.0	7848	89.6
2007	9517.6	1310	98.2	85.6	97.7	82.7	82.9	75.5	8554	97.6
2008	8556.9	1310	80.0	85.3	77.8	82.4	74.4	75.4	7104	80.9
2009	9662.4	1310	89.9	85.5	87.6	82.7	84.2	75.9	7932	90.5
2010	8888.7	1310	83.9	85.4	81.7	82.6	77.5	76.0	7290	83.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					165	
B. Refuelling without a maintenance				32	2	
C. Inspection, maintenance or repair combined with refuelling	1262			810	2	
D. Inspection, maintenance or repair without refuelling				54		
E. Testing of plant systems or components				57		
H. Nuclear regulatory requirements					5	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					8	1
L. Human factor related					30	1
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						19
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			189			
Z. Others		25			6	0
Subtotal	1262	25	189	953	218	21
Total		1476			1192	

7. Equipment Related Full Outages, Analysis by System

System	2010	1990 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		7
14. Safety Systems		10
15. Reactor Cooling Systems		25
16. Steam generation systems		6
21. Fuel Handling and Storage Facilities		17
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		7
33. Circulating Water System		5
35. All other I&C Systems		2
41. Main Generator Systems		39
42. Electrical Power Supply Systems		2
Total	0	138

FR-68 GOLFECH-2

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1310.0 MW(e)
 Design Net Capacity: 1310.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9076.1 GW(e).h
 Energy Availability Factor: 83.6%
 Load Factor: 79.1%
 Operating Factor: 86.5%
 Energy Unavailability Factor: 16.4%
 Total Off-line Time: 1186 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	908.8	731.5	120.4	187.4	957.3	825.8	864.8	813.7	848.4	929.2	918.1	970.5	9076.1
EAF (%)	93.2	83.1	12.4	20.3	99.9	99.3	100.0	99.6	95.1	99.9	99.9	100.0	83.6
UCF (%)	99.4	100.0	16.4	20.3	99.9	99.8	100.0	99.6	95.1	100.0	99.9	100.0	85.8
LF (%)	93.2	83.1	12.4	19.9	98.2	87.6	88.7	83.5	90.0	95.2	97.3	99.6	79.1
OF (%)	100.0	100.0	16.4	25.6	100.0	100.0	100.0	100.0	96.0	100.0	100.0	100.0	86.5
EUf (%)	6.8	16.9	87.6	79.7	0.1	0.7	0.0	0.4	4.9	0.1	0.1	0.0	16.4
PUf (%)	0.0	0.0	83.6	58.9	0.1	0.2	0.0	0.0	0.2	0.0	0.1	0.0	12.0
UCLF (%)	0.6	0.0	0.0	20.9	0.0	0.1	0.0	0.4	4.7	0.0	0.0	0.0	2.2
XUF (%)	6.1	16.9	4.0	0.0	0.0	0.5	0.0	0.0	0.0	0.1	0.0	0.0	2.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 10 Jan 1984 Lifetime Generation: 150222.8 GW(e).h
 Date of First Criticality: 21/05/1993 Cumulative Energy Availability Factor: 84.3%
 Date of Grid Connection: 18/06/1993 Cumulative Load Factor: 76.2%
 Date of Commercial Operation: 03 Apr 1994 Cumulative Unit Capability Factor: 86.2%
 Cumulative Energy Unavailability Factor: 15.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	6507.6	1310	99.7	99.7	99.4	99.4	67.6	67.6	5912	80.5
1995	7030.1	1310	66.7	81.7	62.9	79.6	61.3	64.2	6002	68.5
1996	9016.4	1310	84.7	82.8	83.6	81.0	78.4	69.2	7549	85.9
1997	8649.9	1310	83.7	83.0	80.2	80.8	75.4	70.8	7414	84.6
1998	8359.6	1310	85.1	83.4	82.9	81.2	72.8	71.2	7222	82.4
1999	9516.9	1310	98.0	85.9	97.7	84.0	82.9	73.2	8407	96.0
2000	8877.6	1310	84.5	85.7	81.8	83.7	77.1	73.8	7535	85.8
2001	8958.3	1310	85.3	85.7	84.3	83.8	78.1	74.3	7586	86.6
2002	9847.1	1310	97.3	87.0	97.3	85.3	85.8	75.6	8553	97.6
2003	7614.9	1310	77.7	86.0	75.2	84.3	66.4	74.7	7115	81.2
2004	7093.7	1310	65.7	84.2	65.7	82.6	61.6	73.5	6129	69.8
2005	9936.3	1310	99.2	85.4	98.9	84.0	86.6	74.6	8715	99.5
2006	8516.6	1310	84.8	85.4	78.2	83.5	74.2	74.6	7150	81.6
2007	9922.0	1310	90.9	85.8	90.2	84.0	86.5	75.4	8026	91.6
2008	8484.2	1310	79.2	85.3	76.7	83.5	73.7	75.3	7095	80.8
2009	9982.8	1310	99.5	86.2	96.6	84.3	87.0	76.0	8301	94.8
2010	9076.1	1310	85.8	86.2	83.6	84.3	79.1	76.2	7574	86.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		30			246	
B. Refuelling without a maintenance	1007				0	
C. Inspection, maintenance or repair combined with refuelling				742	2	
E. Testing of plant systems or components				45		
H. Nuclear regulatory requirements					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					41	1
L. Human factor related					16	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						11
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						0
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					4	
Z. Others		150				24
Subtotal	1007	180	0	787	311	36
Total		1187			1134	

7. Equipment Related Full Outages, Analysis by System

System	2010	1993 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		36
13. Reactor Auxiliary Systems		6
14. Safety Systems		4
15. Reactor Cooling Systems		10
16. Steam generation systems		2
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		0
33. Circulating Water System		2
41. Main Generator Systems	30	139
42. Electrical Power Supply Systems		12
XX. Miscellaneous Systems		1
Total	30	222

FR-20 GRAVELINES-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6334.9 GW(e).h
Energy Availability Factor: 82.0%
Load Factor: 79.5%
Operating Factor: 83.9%
Energy Unavailability Factor: 18.0%
Total Off-line Time: 1412 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	655.4	591.8	614.8	624.1	615.1	354.6	410.8	82.8	514.6	651.3	645.5	573.9	6334.9
EAF (%)	99.3	100.0	93.6	99.7	98.5	59.1	60.7	12.3	78.6	98.5	99.8	86.3	82.0
UCF (%)	99.3	100.0	93.6	99.7	98.8	59.9	63.3	13.9	79.6	99.7	100.0	86.3	82.7
LF (%)	96.8	96.8	90.9	95.3	90.9	54.1	60.7	12.2	78.5	96.1	98.5	84.8	79.5
OF (%)	100.0	100.0	95.0	100.0	100.0	60.3	66.1	13.4	85.4	100.0	100.0	88.2	83.9
EUf (%)	0.7	0.0	6.4	0.3	1.5	40.9	39.3	87.7	21.4	1.5	0.2	13.7	18.0
PUF (%)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	79.0	5.5	0.0	0.0	0.1	7.2
UCLF (%)	0.7	0.0	6.4	0.3	1.1	40.1	36.7	7.1	14.9	0.2	0.0	13.6	10.1
XUF (%)	0.0	0.0	0.0	0.0	0.3	0.8	2.5	1.5	1.0	1.2	0.2	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 02 Jan 1975
Date of First Criticality: 21/02/1980
Date of Grid Connection: 13/03/1980
Date of Commercial Operation: 25/11/1980
Lifetime Generation: 171319.1 GW(e).h
Cumulative Energy Availability Factor: 76.4%
Cumulative Load Factor: 70.8%
Cumulative Unit Capability Factor: 78.0%
Cumulative Energy Unavailability Factor: 23.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	920.0	918	68.4	68.4	68.4	68.4	68.3	68.3	1037	70.8
1981	5001.8	920	63.2	64.0	63.2	64.0	62.1	63.0	5785	66.0
1982	2987.5	910	38.2	52.2	38.2	52.2	37.5	51.3	3602	41.1
1983	5537.0	910	69.9	57.8	69.9	57.8	69.5	57.0	6237	71.2
1984	6617.0	910	86.2	64.6	86.2	64.6	82.8	63.2	7654	87.1
1985	6211.7	910	81.3	67.8	80.3	67.6	77.9	66.0	7218	82.4
1986	5725.5	910	74.8	68.9	73.4	68.6	71.8	67.0	6508	74.3
1987	4650.1	910	89.3	71.8	89.0	71.4	58.3	65.8	5895	67.3
1988	4289.0	910	57.6	70.0	57.0	69.6	53.7	64.3	5306	60.4
1989	5109.6	910	67.7	69.8	67.7	69.4	64.1	64.3	6224	71.1
1990	4463.6	910	61.3	68.9	59.2	68.4	56.0	63.4	5425	61.9
1991	5675.0	910	74.0	69.4	73.4	68.9	71.2	64.1	6619	75.6
1992	5834.7	910	84.0	70.6	80.7	69.8	73.0	64.9	7250	82.5
1993	5866.9	910	93.8	72.4	80.5	70.6	73.6	65.5	7794	89.0
1994	4657.7	910	68.6	72.1	67.7	70.4	58.4	65.0	5729	65.4
1995	6123.1	910	83.8	72.9	82.8	71.2	76.8	65.8	7461	85.2
1996	6089.2	910	83.5	73.5	80.3	71.8	76.2	66.4	7357	83.8
1997	5860.4	910	82.9	74.1	81.7	72.4	73.5	66.9	7236	82.6
1998	6321.4	910	87.1	74.8	83.7	73.0	79.3	67.5	7622	87.0
1999	5841.3	910	80.3	75.1	78.6	73.3	73.3	67.8	7116	81.2
2000	6531.9	910	88.2	75.7	88.1	74.0	81.7	68.5	7705	87.7
2001	5289.4	910	67.6	75.3	66.7	73.7	66.4	68.4	6034	68.9
2002	5769.3	915	88.7	75.9	86.4	74.3	72.0	68.6	7057	80.6
2003	5919.5	910	85.7	76.4	85.1	74.7	74.3	68.8	7420	84.7
2004	6213.9	910	86.4	76.8	86.2	75.2	77.7	69.2	7664	87.2
2005	6188.7	910	84.6	77.1	82.5	75.5	77.6	69.5	7400	84.5
2006	6244.4	910	84.9	77.4	82.8	75.8	78.3	69.9	7567	86.4
2007	6168.2	910	82.4	77.6	80.1	75.9	77.4	70.1	7312	83.5
2008	6716.7	910	91.8	78.1	89.1	76.4	84.0	70.6	8146	92.7
2009	5348.2	910	72.6	77.9	70.0	76.2	67.1	70.5	6527	74.5
2010	6334.9	910	82.7	78.0	82.0	76.4	79.5	70.8	7348	83.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		708			481	
B. Refuelling without a maintenance	588			37	1	
C. Inspection, maintenance or repair combined with refuelling				1065	15	
D. Inspection, maintenance or repair without refuelling				10	4	
E. Testing of plant systems or components				13	5	
H. Nuclear regulatory requirements					6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					28	18
L. Human factor related					14	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			7			
Z. Others		111			14	
Subtotal	588	819	7	1125	568	19
Total		1414			1712	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		172
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		15
14. Safety Systems		8
15. Reactor Cooling Systems		97
16. Steam generation systems		90
31. Turbine and auxiliaries	620	20
32. Feedwater and Main Steam System		18
33. Circulating Water System		1
41. Main Generator Systems		12
42. Electrical Power Supply Systems		31
XX. Miscellaneous Systems	88	3
Total	708	474

FR-21 GRAVELINES-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5223.1 GW(e).h
Energy Availability Factor: 67.7%
Load Factor: 65.5%
Operating Factor: 70.2%
Energy Unavailability Factor: 32.3%
Total Off-line Time: 2611 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	640.5	604.4	543.3	0.0	0.0	334.6	623.4	609.5	607.5	446.0	146.8	667.2	5223.1
EAF (%)	99.6	99.6	80.4	0.0	0.0	53.2	94.2	97.7	98.7	67.8	22.8	98.6	67.7
UCF (%)	99.6	99.7	83.8	0.0	1.1	53.2	98.1	99.3	99.9	68.5	22.8	98.6	68.7
LF (%)	94.6	98.8	80.4	0.0	0.0	51.1	92.1	90.0	92.7	65.8	22.4	98.5	65.5
OF (%)	100.0	100.0	84.1	0.0	0.0	63.8	100.0	100.0	100.0	69.1	25.3	100.0	70.2
EUf (%)	0.4	0.4	19.6	100.0	100.0	46.8	5.8	2.3	1.3	32.2	77.2	1.4	32.3
PUF (%)	0.0	0.3	16.2	100.0	38.8	10.6	0.7	0.1	0.1	0.0	0.0	0.0	13.9
UCLF (%)	0.4	0.0	0.0	0.0	60.1	36.2	1.2	0.6	0.0	31.5	77.2	1.4	17.4
XUF (%)	0.0	0.2	3.5	0.0	1.1	0.0	3.9	1.6	1.3	0.7	0.0	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 03 Jan 1975
Date of First Criticality: 08 Feb 1980
Date of Grid Connection: 26/08/1980
Date of Commercial Operation: 12 Jan 1980

Lifetime Generation: 177460.3 GW(e).h
Cumulative Energy Availability Factor: 79.1%
Cumulative Load Factor: 73.6%
Cumulative Unit Capability Factor: 80.4%
Cumulative Energy Unavailability Factor: 20.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	515.0	914	74.7	74.7	74.7	74.7	75.2	75.2	571	76.7
1981	5949.2	920	81.2	80.7	81.2	80.7	73.8	73.9	7276	83.1
1982	2118.5	910	29.2	56.1	29.2	56.1	26.6	51.3	2732	31.2
1983	6130.0	910	77.9	63.2	77.9	63.2	76.9	59.6	6917	79.0
1984	5749.0	910	82.0	67.8	82.0	67.8	71.9	62.6	6751	76.9
1985	6829.7	910	90.2	72.2	89.7	72.1	85.7	67.1	7950	90.8
1986	6422.0	910	96.6	76.2	96.4	76.1	80.6	69.3	7956	90.8
1987	5357.9	910	77.4	76.4	75.2	75.9	67.2	69.0	6807	77.7
1988	5577.0	910	81.3	77.0	77.2	76.1	69.8	69.1	7227	82.3
1989	6412.9	910	84.6	77.8	83.6	76.9	80.4	70.4	7460	85.2
1990	6143.1	910	80.6	78.1	79.6	77.2	77.1	71.0	7164	81.8
1991	4915.9	910	63.6	76.8	63.0	75.9	61.7	70.2	5648	64.5
1992	6124.2	910	80.6	77.1	78.2	76.1	76.6	70.7	7149	81.4
1993	6219.9	910	82.3	77.5	79.3	76.3	78.0	71.3	7297	83.3
1994	6293.7	910	86.2	78.1	82.7	76.8	79.0	71.8	7638	87.2
1995	5599.7	910	75.6	77.9	74.6	76.6	70.2	71.7	6735	76.9
1996	5235.9	910	70.7	77.5	69.7	76.2	65.5	71.3	6361	72.4
1997	6641.2	910	98.0	78.7	97.8	77.5	83.3	72.0	8006	91.4
1998	5531.4	910	82.2	78.9	82.1	77.7	69.4	71.9	6896	78.7
1999	6394.4	910	87.8	79.3	85.3	78.1	80.2	72.3	7705	88.0
2000	5582.7	910	80.5	79.4	77.3	78.1	69.8	72.2	6952	79.1
2001	5984.5	910	85.5	79.7	85.0	78.4	75.1	72.3	7601	86.8
2002	5254.3	915	74.4	79.5	72.4	78.1	65.6	72.0	6658	76.0
2003	6553.9	910	89.6	79.9	89.2	78.6	82.2	72.5	7986	91.2
2004	6009.0	910	81.8	80.0	80.4	78.7	75.2	72.6	7262	82.7
2005	6622.6	910	88.2	80.3	86.6	79.0	83.1	73.0	7880	89.9
2006	6222.4	910	81.7	80.4	79.6	79.0	78.1	73.2	7369	84.1
2007	6522.6	910	88.0	80.6	86.4	79.3	81.8	73.5	7796	89.0
2008	6124.1	910	80.7	80.6	78.3	79.3	76.6	73.6	7271	82.8
2009	6537.4	910	86.5	80.8	84.5	79.5	82.0	73.9	7696	87.9
2010	5223.1	910	68.7	80.4	67.7	79.1	65.5	73.6	6149	70.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1337			165	
B. Refuelling without a maintenance				61		
C. Inspection, maintenance or repair combined with refuelling	1127			972	41	
D. Inspection, maintenance or repair without refuelling				62		
E. Testing of plant systems or components	0			25		
H. Nuclear regulatory requirements					0	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				19	43	52
L. Human factor related					10	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			8			0
Z. Others		139			9	
Subtotal	1127	1476	8	1139	268	53
Total		2611			1460	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	144	7
12. Reactor I&C Systems	62	9
13. Reactor Auxiliary Systems	16	12
14. Safety Systems	46	7
15. Reactor Cooling Systems	8	23
16. Steam generation systems		21
21. Fuel Handling and Storage Facilities	174	2
31. Turbine and auxiliaries	80	13
32. Feedwater and Main Steam System	221	15
35. All other I&C Systems	11	
41. Main Generator Systems	414	23
42. Electrical Power Supply Systems	12	11
XX. Miscellaneous Systems	149	7
Total	1337	150

FR-27 GRAVELINES-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5689.3 GW(e).h
Energy Availability Factor: 71.7%
Load Factor: 71.4%
Operating Factor: 74.8%
Energy Unavailability Factor: 28.3%
Total Off-line Time: 2210 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	407.4	353.3	0.0	0.0	418.8	623.3	647.4	641.2	630.4	658.5	639.4	669.7	5689.3
EAF (%)	60.3	58.2	0.0	0.0	61.9	95.2	95.7	94.7	96.2	98.0	99.3	99.8	71.7
UCF (%)	60.3	58.2	0.0	0.0	62.0	98.8	99.1	98.9	99.9	100.0	99.6	99.8	73.2
LF (%)	60.2	57.8	0.0	0.0	61.9	95.1	95.6	94.7	96.2	97.1	97.6	98.9	71.4
OF (%)	63.2	61.0	0.0	0.0	71.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	74.8
EUf (%)	39.7	41.8	100.0	100.0	38.1	4.8	4.3	5.3	3.8	2.0	0.7	0.2	28.3
PUF (%)	0.1	32.0	100.0	66.9	5.4	0.4	0.0	0.6	0.0	0.0	0.1	0.0	17.0
UCLF (%)	39.5	9.8	0.0	33.1	32.7	0.8	0.8	0.5	0.1	0.0	0.3	0.3	9.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	3.6	3.5	4.2	3.7	2.0	0.3	0.0	1.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BASE LOAD

5. Historical Summary

Date of Construction Start: 12 Jan 1975
Date of First Criticality: 30/11/1980
Date of Grid Connection: 12 Dec 1980
Date of Commercial Operation: 06 Jan 1981

Lifetime Generation: 176111.9 GW(e).h
Cumulative Energy Availability Factor: 78.7%
Cumulative Load Factor: 74.0%
Cumulative Unit Capability Factor: 80.2%
Cumulative Energy Unavailability Factor: 21.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	3699.8	920	84.4	84.4	84.4	84.4	78.3	78.3	4462	86.9
1982	3445.0	910	47.6	61.3	47.6	61.3	43.2	56.3	4260	48.6
1983	6006.0	910	78.6	68.0	78.5	67.9	75.3	63.6	7194	82.1
1984	6746.0	910	83.9	72.4	83.9	72.4	84.4	69.4	7505	85.4
1985	6294.4	910	80.1	74.1	80.1	74.1	79.0	71.5	7151	81.6
1986	6504.5	910	81.7	75.5	81.7	75.4	81.6	73.3	7335	83.7
1987	5382.9	910	75.5	75.5	74.3	75.3	67.5	72.4	6188	70.6
1988	4819.0	910	96.2	78.2	95.4	77.9	60.3	70.8	6724	76.5
1989	6307.7	910	82.3	78.7	79.5	78.1	79.1	71.8	7320	83.6
1990	6121.5	910	80.6	78.9	77.6	78.1	76.8	72.3	7114	81.2
1991	6306.3	910	81.3	79.1	80.5	78.3	79.1	73.0	7086	80.9
1992	4772.4	910	60.4	77.5	60.0	76.7	59.7	71.8	5388	61.3
1993	6588.1	910	85.2	78.1	82.9	77.2	82.6	72.7	7567	86.4
1994	6308.9	910	83.8	78.5	83.0	77.6	79.1	73.1	7116	81.2
1995	6221.7	910	84.3	78.9	83.0	78.0	78.0	73.5	7326	83.6
1996	5937.2	910	85.9	79.4	83.0	78.3	74.3	73.5	7377	84.0
1997	5752.7	910	81.1	79.5	78.9	78.3	72.2	73.4	6938	79.2
1998	6152.4	910	83.9	79.7	83.0	78.6	77.2	73.7	7330	83.7
1999	5412.9	910	79.1	79.7	76.9	78.5	67.9	73.4	6709	76.6
2000	6112.4	910	84.6	79.9	82.9	78.7	76.5	73.5	7396	84.2
2001	6198.0	910	92.6	80.6	83.9	79.0	77.8	73.7	7597	86.7
2002	5282.5	915	76.8	80.4	76.8	78.9	65.9	73.4	6401	73.1
2003	6045.5	910	85.8	80.6	85.8	79.2	75.8	73.5	7482	85.4
2004	6393.1	910	83.9	80.8	83.8	79.4	80.0	73.7	7499	85.4
2005	6075.9	910	78.9	80.7	77.2	79.3	76.2	73.8	7126	81.3
2006	6501.2	910	86.7	80.9	85.7	79.5	81.6	74.1	7834	89.4
2007	6265.6	910	81.4	80.9	79.6	79.6	78.6	74.3	7267	82.9
2008	6027.1	910	78.6	80.9	76.5	79.4	75.4	74.3	7335	83.5
2009	5272.8	910	68.8	80.4	66.7	79.0	66.1	74.1	6303	72.0
2010	5689.3	910	73.2	80.2	71.7	78.7	71.4	74.0	6550	74.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		684			328	
B. Refuelling without a maintenance	1439			48	1	
C. Inspection, maintenance or repair combined with refuelling				964	25	
D. Inspection, maintenance or repair without refuelling				1		
E. Testing of plant systems or components				8	0	2
H. Nuclear regulatory requirements					1	1
J. Grid limitation, failure or grid unavailability						7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	59
L. Human factor related					9	1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						1
Z. Others		87			23	
Subtotal	1439	771	0	1021	410	71
Total		2210			1502	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems	53	10
13. Reactor Auxiliary Systems		20
14. Safety Systems	112	4
15. Reactor Cooling Systems		29
16. Steam generation systems	216	48
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries	10	21
32. Feedwater and Main Steam System		16
35. All other I&C Systems	14	
41. Main Generator Systems	274	103
42. Electrical Power Supply Systems		26
XX. Miscellaneous Systems	5	10
Total	684	299

FR-28 GRAVELINES-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
 Design Net Capacity: 910.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6785.7 GW(e).h
 Energy Availability Factor: 88.5%
 Load Factor: 85.1%
 Operating Factor: 90.8%
 Energy Unavailability Factor: 11.5%
 Total Off-line Time: 802 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	618.5	591.0	652.7	612.9	295.1	245.6	639.9	585.3	593.1	659.4	633.2	659.0	6785.7
EAF (%)	94.1	99.5	99.3	99.2	44.1	37.5	96.9	98.5	98.3	98.1	99.2	97.9	88.5
UCF (%)	94.1	99.5	99.3	99.2	45.3	37.5	99.5	99.3	99.6	99.2	99.3	97.9	89.1
LF (%)	91.4	96.7	96.5	93.5	43.6	37.5	94.5	86.4	90.5	97.3	96.6	97.3	85.1
OF (%)	100.0	100.0	100.0	100.0	45.4	45.0	100.0	100.0	100.0	100.0	100.0	100.0	90.8
EUf (%)	5.9	0.5	0.7	0.8	55.9	62.5	3.1	1.5	1.7	1.9	0.8	2.1	11.5
PUF (%)	0.1	0.0	0.1	0.0	54.6	36.1	0.3	0.0	0.0	0.1	0.0	0.1	7.7
UCLF (%)	5.8	0.5	0.6	0.8	0.1	26.4	0.2	0.7	0.4	0.8	0.7	2.0	3.2
XUF (%)	0.0	0.0	0.0	0.0	1.2	0.0	2.6	0.9	1.3	1.0	0.1	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 04 Jan 1976
 Date of First Criticality: 31/05/1981
 Date of Grid Connection: 14/06/1981
 Date of Commercial Operation: 10 Jan 1981

Lifetime Generation: 176094.6 GW(e).h
 Cumulative Energy Availability Factor: 79.4%
 Cumulative Load Factor: 75.1%
 Cumulative Unit Capability Factor: 80.8%
 Cumulative Energy Unavailability Factor: 20.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	1722.2	915	85.4	85.4	85.4	85.4	84.8	84.8	2031	92.0
1982	5498.2	910	80.8	81.7	80.8	81.7	69.0	72.2	7193	82.1
1983	4062.0	910	54.5	69.6	54.5	69.6	51.0	62.8	4986	56.9
1984	6006.0	910	82.8	73.7	82.8	73.7	75.1	66.6	7173	81.7
1985	6178.8	910	83.6	76.0	80.9	75.4	77.5	69.1	7387	84.3
1986	6556.6	910	88.7	78.4	88.6	77.9	82.2	71.6	7862	89.7
1987	5472.8	910	77.2	78.2	75.8	77.6	68.7	71.2	6787	77.5
1988	6221.0	910	87.9	79.6	85.9	78.7	77.8	72.1	7789	88.7
1989	4982.3	910	67.4	78.1	66.9	77.3	62.5	70.9	6025	68.8
1990	6151.7	910	79.4	78.2	77.2	77.3	77.2	71.6	7058	80.6
1991	6262.0	910	81.8	78.6	80.5	77.6	78.6	72.3	7067	80.7
1992	6419.8	910	81.0	78.8	80.2	77.8	80.3	73.0	7137	81.3
1993	4680.6	910	76.5	78.6	75.3	77.6	58.7	71.8	6112	69.8
1994	6039.3	910	83.3	79.0	82.5	78.0	75.8	72.1	6824	77.9
1995	6289.5	910	86.4	79.5	85.4	78.5	78.9	72.6	7313	83.5
1996	6288.4	910	85.5	79.9	83.2	78.8	78.7	73.0	7552	86.0
1997	5986.7	910	81.3	80.0	80.5	78.9	75.1	73.1	7206	82.3
1998	6519.3	910	85.4	80.3	84.1	79.2	81.8	73.6	7570	86.4
1999	5550.9	910	76.4	80.1	74.3	78.9	69.6	73.4	6734	76.9
2000	4563.6	910	69.5	79.5	57.7	77.8	57.1	72.6	5453	62.1
2001	5990.7	910	79.8	79.5	78.3	77.9	75.2	72.7	7094	81.0
2002	6028.1	915	81.2	79.6	80.1	78.0	75.2	72.8	7219	82.4
2003	5701.9	910	74.2	79.4	74.2	77.8	71.5	72.7	6589	75.2
2004	6544.6	910	85.4	79.6	85.4	78.1	81.9	73.1	7693	87.6
2005	6437.1	910	82.2	79.7	81.7	78.3	80.7	73.5	7354	83.9
2006	7123.1	910	91.5	80.2	89.9	78.7	89.4	74.1	8079	92.2
2007	6341.0	910	81.1	80.2	79.8	78.8	79.5	74.3	7164	81.8
2008	6663.0	910	85.8	80.4	85.0	79.0	83.4	74.6	7678	87.4
2009	6312.5	910	83.6	80.5	81.4	79.1	79.2	74.8	7342	83.8
2010	6785.7	910	89.1	80.8	88.5	79.4	85.1	75.1	7958	90.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010		
	Planned	Unplanned	External	Average Hours Lost Per Year		
				Planned	Unplanned	External
A. Plant equipment problem/failure		86			369	
B. Refuelling without a maintenance	612			46		
C. Inspection, maintenance or repair combined with refuelling				1011	9	
D. Inspection, maintenance or repair without refuelling				6	12	
E. Testing of plant systems or components	1			4	1	1
H. Nuclear regulatory requirements					9	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	31
L. Human factor related					3	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						2
Z. Others		104			10	
Subtotal	613	190	0	1067	423	35
Total		803			1525	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		19
12. Reactor I&C Systems	43	51
13. Reactor Auxiliary Systems		3
14. Safety Systems		21
15. Reactor Cooling Systems		32
16. Steam generation systems		60
21. Fuel Handling and Storage Facilities	8	3
31. Turbine and auxiliaries	6	28
32. Feedwater and Main Steam System		24
33. Circulating Water System		0
35. All other I&C Systems	4	
41. Main Generator Systems		49
42. Electrical Power Supply Systems	8	61
XX. Miscellaneous Systems	17	3
Total	86	354

FR-51 GRAVELINES-5

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
Design Net Capacity: 910.0 MW(e)
Design Discharge Burnup: 47000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6228.4 GW(e).h
Energy Availability Factor: 79.3%
Load Factor: 78.1%
Operating Factor: 81.3%
Energy Unavailability Factor: 20.7%
Total Off-line Time: 1640 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	663.1	600.3	652.8	639.3	654.8	212.3	0.0	320.7	641.2	566.9	610.2	666.8	6228.4
EAF (%)	99.7	99.7	99.3	99.7	97.0	32.6	0.0	47.4	98.1	85.6	95.1	99.4	79.3
UCF (%)	99.7	99.7	99.3	99.7	100.0	37.8	1.6	47.4	98.7	86.2	95.2	99.4	80.2
LF (%)	97.9	98.2	96.5	97.6	96.7	32.4	0.0	47.4	97.9	83.6	93.1	98.5	78.1
OF (%)	100.0	100.0	100.0	100.0	100.0	36.9	0.0	57.1	100.0	87.7	95.7	100.0	81.3
EUF (%)	0.3	0.3	0.7	0.3	3.0	67.4	100.0	52.6	1.9	14.4	4.9	0.6	20.7
PUF (%)	0.2	0.3	0.2	0.3	0.0	62.2	98.1	9.7	1.3	0.0	0.0	0.1	14.5
UCLF (%)	0.0	0.0	0.6	0.0	0.0	0.0	0.3	42.9	0.0	13.8	4.8	0.4	5.3
XUF (%)	0.0	0.0	0.0	0.0	3.0	5.2	1.6	0.0	0.6	0.6	0.1	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 10 Jan 1979
Date of First Criticality: 08 May 1984
Date of Grid Connection: 28/08/1984
Date of Commercial Operation: 15/01/1985

Lifetime Generation: 157335.4 GW(e).h
Cumulative Energy Availability Factor: 80.6%
Cumulative Load Factor: 75.5%
Cumulative Unit Capability Factor: 82.3%
Cumulative Energy Unavailability Factor: 19.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	6768.4	910	90.1	90.1	90.0	90.0	84.9	84.9	7785	88.9
1986	5152.6	910	77.1	83.6	75.2	82.6	64.6	74.8	6673	76.2
1987	5236.5	910	81.5	82.9	80.6	82.0	65.7	71.7	6818	77.8
1988	4964.0	910	75.3	81.0	71.8	79.4	62.1	69.3	6306	71.8
1989	6020.6	910	81.0	81.0	80.6	79.7	75.5	70.6	7198	82.2
1990	5992.8	910	83.2	81.4	80.7	79.8	75.2	71.3	7367	84.1
1991	5276.2	910	72.2	80.0	69.6	78.4	66.2	70.6	6352	72.5
1992	6308.0	910	82.6	80.4	82.6	78.9	78.9	71.6	7361	83.8
1993	6180.5	910	82.7	80.6	78.6	78.9	77.5	72.3	7290	83.2
1994	5793.2	910	84.4	81.0	83.2	79.3	72.7	72.3	7147	81.6
1995	6181.0	910	87.6	81.6	86.0	79.9	77.5	72.8	7704	87.9
1996	5495.2	910	75.3	81.1	72.1	79.3	68.7	72.5	6652	75.7
1997	6429.9	910	87.6	81.6	86.1	79.8	80.7	73.1	7586	86.6
1998	6884.3	910	97.3	82.7	95.8	80.9	86.4	74.0	8286	94.6
1999	5124.3	910	68.1	81.7	67.0	80.0	64.3	73.4	6127	69.9
2000	5985.5	910	84.4	81.9	81.4	80.1	74.9	73.5	7444	84.7
2001	5762.6	910	80.2	81.8	78.2	80.0	72.3	73.4	6990	79.8
2002	6423.4	915	85.9	82.0	84.8	80.2	80.1	73.8	7662	87.5
2003	6473.4	910	85.1	82.2	84.3	80.5	81.2	74.2	7518	85.8
2004	6613.5	910	88.8	82.5	86.2	80.8	82.7	74.6	7836	89.2
2005	6410.0	910	84.0	82.6	81.7	80.8	80.4	74.9	7524	85.9
2006	5313.2	910	69.8	82.0	68.8	80.3	66.7	74.5	6313	72.1
2007	6510.2	910	85.4	82.2	83.5	80.4	81.7	74.8	7592	86.7
2008	6357.8	910	82.3	82.2	81.2	80.4	79.5	75.0	7352	83.7
2009	6652.2	910	88.3	82.4	85.5	80.6	83.4	75.4	7846	89.6
2010	6228.4	910	80.2	82.3	79.3	80.6	78.1	75.5	7120	81.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		244			310	
B. Refuelling without a maintenance				43		
C. Inspection, maintenance or repair combined with refuelling	1178			902	23	
D. Inspection, maintenance or repair without refuelling				3		
E. Testing of plant systems or components	0			3	0	
H. Nuclear regulatory requirements					1	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	0
L. Human factor related		159			14	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			19			
Z. Others		41			8	
Subtotal	1178	444	19	951	365	1
Total		1641			1317	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		18
12. Reactor I&C Systems	32	13
13. Reactor Auxiliary Systems	92	29
14. Safety Systems	7	0
15. Reactor Cooling Systems		83
16. Steam generation systems	60	7
21. Fuel Handling and Storage Facilities	10	3
31. Turbine and auxiliaries	31	14
32. Feedwater and Main Steam System		15
33. Circulating Water System		1
35. All other I&C Systems	6	0
41. Main Generator Systems		37
42. Electrical Power Supply Systems	6	56
XX. Miscellaneous Systems		3
Total	244	279

FR-52 GRAVELINES-6

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 910.0 MW(e)
 Design Net Capacity: 910.0 MW(e)
 Design Discharge Burnup: 47000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6363.9 GW(e).h
 Energy Availability Factor: 80.1%
 Load Factor: 79.8%
 Operating Factor: 81.3%
 Energy Unavailability Factor: 19.9%
 Total Off-line Time: 1635 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	676.8	617.7	626.6	648.3	642.7	632.5	667.4	666.0	64.8	0.0	434.4	686.9	6363.9
EAF (%)	100.0	99.8	93.4	100.0	97.3	98.5	99.4	99.5	9.9	0.0	65.0	99.4	80.1
UCF (%)	100.0	99.8	93.5	100.0	97.3	98.5	99.7	99.5	9.9	4.6	68.6	99.4	80.9
LF (%)	100.0	101.0	92.7	98.9	94.9	96.5	98.6	98.4	9.9	0.0	66.3	101.5	79.8
OF (%)	100.0	100.0	94.2	100.0	100.0	100.0	100.0	100.0	10.1	0.0	72.2	100.0	81.3
EUf (%)	0.0	0.2	6.6	0.0	2.7	1.5	0.6	0.5	90.1	100.0	35.0	0.6	19.9
PUF (%)	0.0	0.2	0.2	0.0	0.1	0.0	0.0	0.1	90.1	95.4	5.4	0.2	16.0
UCLF (%)	0.0	0.0	6.4	0.0	2.6	1.5	0.3	0.4	0.0	0.0	25.9	0.4	3.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	4.6	3.6	0.0	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 10 Jan 1979 Lifetime Generation: 155324.7 GW(e).h
 Date of First Criticality: 21/07/1985 Cumulative Energy Availability Factor: 80.2%
 Date of Grid Connection: 08 Jan 1985 Cumulative Load Factor: 76.9%
 Date of Commercial Operation: 25/10/1985 Cumulative Unit Capability Factor: 81.6%
 Cumulative Energy Unavailability Factor: 19.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]		Factor [%]		Annual	Cumul.	Hours	OF [%]
			Annual	Cumul.	Annual	Cumul.				
1985	1740.9	910	88.7	88.7	88.6	88.6	86.6	86.6	2003	90.7
1986	5540.4	910	76.3	78.8	75.9	78.4	69.5	73.0	6677	76.2
1987	5583.9	910	80.6	79.6	80.1	79.2	70.0	71.7	7031	80.3
1988	6490.0	910	83.8	80.9	81.4	79.9	81.2	74.6	7453	84.8
1989	5177.3	910	71.2	78.6	71.1	77.8	64.9	72.3	6274	71.6
1990	6120.3	910	87.6	80.3	87.1	79.6	76.8	73.2	7553	86.2
1991	5888.2	910	78.5	80.0	77.5	79.2	73.9	73.3	6953	79.4
1992	5085.1	910	70.3	78.7	69.0	77.8	63.6	71.9	6246	71.1
1993	5293.6	910	82.0	79.1	73.4	77.3	66.4	71.3	6751	77.1
1994	6053.7	910	86.0	79.8	83.9	78.0	75.9	71.8	7487	85.5
1995	6769.4	910	89.8	80.8	88.8	79.1	84.9	73.1	7922	90.4
1996	6609.5	910	86.8	81.3	86.4	79.7	82.7	73.9	7755	88.3
1997	4545.4	910	60.6	79.6	59.5	78.1	57.0	72.5	5437	62.1
1998	6531.8	910	88.5	80.3	86.1	78.7	81.9	73.3	7746	88.4
1999	6141.4	910	80.9	80.4	80.3	78.8	77.0	73.5	7222	82.4
2000	6720.9	910	88.7	80.9	87.0	79.3	84.1	74.2	7887	89.8
2001	6148.7	910	82.2	81.0	80.2	79.4	77.1	74.4	7265	82.9
2002	6690.9	915	87.5	81.4	86.0	79.8	83.5	74.9	7784	88.9
2003	6462.6	910	83.3	81.5	82.5	79.9	81.1	75.3	7410	84.6
2004	6936.1	910	88.3	81.8	86.9	80.3	86.8	75.9	7850	89.4
2005	6536.5	910	84.3	81.9	82.4	80.4	82.0	76.2	7511	85.7
2006	7058.4	910	89.3	82.3	88.3	80.8	88.5	76.7	7907	90.3
2007	5455.7	910	69.1	81.7	68.4	80.2	68.4	76.4	6087	69.5
2008	5792.8	910	71.5	81.3	71.5	79.8	72.5	76.2	6383	72.7
2009	7108.2	910	89.0	81.6	89.0	80.2	89.2	76.7	7866	89.8
2010	6363.9	910	80.9	81.6	80.1	80.2	79.8	76.9	7125	81.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		177			340	2
B. Refuelling without a maintenance				49	2	
C. Inspection, maintenance or repair combined with refuelling	1358			878	28	
D. Inspection, maintenance or repair without refuelling					20	
E. Testing of plant systems or components	0			10		
H. Nuclear regulatory requirements					5	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					33	2
L. Human factor related					7	1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			60			1
Z. Others		40			17	0
Subtotal	1358	217	60	937	452	6
Total		1635			1395	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems	113	18
13. Reactor Auxiliary Systems		79
14. Safety Systems		15
15. Reactor Cooling Systems		32
16. Steam generation systems		5
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	11	75
32. Feedwater and Main Steam System	43	18
33. Circulating Water System		0
35. All other I&C Systems		0
41. Main Generator Systems		20
42. Electrical Power Supply Systems		43
XX. Miscellaneous Systems	10	1
Total	177	308

FR-58 NOGENT-1

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1310.0 MW(e)
 Design Net Capacity: 1310.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10382.4 GW(e).h
 Energy Availability Factor: 96.4%
 Load Factor: 90.5%
 Operating Factor: 96.8%
 Energy Unavailability Factor: 3.6%
 Total Off-line Time: 278 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	889.8	837.9	870.3	874.9	896.9	775.8	885.8	886.8	704.1	913.0	897.5	949.4	10382.4
EAF (%)	94.9	99.9	94.5	100.0	99.6	90.1	98.4	99.8	80.7	98.7	100.0	99.7	96.4
UCF (%)	94.9	99.9	94.5	100.0	99.6	99.9	98.4	99.8	80.7	98.8	100.0	99.7	97.2
LF (%)	91.3	95.2	89.4	92.8	92.0	82.3	90.9	91.0	74.6	93.6	95.2	97.4	90.5
OF (%)	95.4	100.0	96.6	100.0	100.0	90.4	99.3	100.0	80.8	99.1	100.0	100.0	96.8
EUf (%)	5.1	0.1	5.5	0.0	0.4	9.9	1.6	0.2	19.3	1.3	0.0	0.3	3.6
PUF (%)	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	5.0	0.1	5.4	0.0	0.2	0.1	1.5	0.2	19.2	1.2	0.0	0.3	2.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 26/05/1981
 Date of First Criticality: 09 Dec 1987
 Date of Grid Connection: 21/10/1987
 Date of Commercial Operation: 24/02/1988

Lifetime Generation: 189461.6 GW(e).h
 Cumulative Energy Availability Factor: 77.2%
 Cumulative Load Factor: 71.7%
 Cumulative Unit Capability Factor: 79.1%
 Cumulative Energy Unavailability Factor: 22.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	7028.0	1310	88.5	88.5	87.6	87.6	66.7	66.7	6701	83.3
1989	3172.7	1310	30.2	58.1	28.3	56.7	27.6	46.3	2663	30.4
1990	6614.1	1310	67.7	61.4	67.5	60.4	57.6	50.2	5590	63.8
1991	6868.6	1310	64.2	62.1	62.9	61.0	59.9	52.7	5768	65.8
1992	7812.5	1310	71.5	64.0	70.4	62.9	67.9	55.8	6386	72.7
1993	7705.6	1310	72.2	65.4	68.5	63.9	67.1	57.7	6432	73.4
1994	8292.3	1310	83.2	68.0	80.1	66.2	72.3	59.8	7429	84.8
1995	7358.3	1310	84.3	70.0	83.9	68.5	64.1	60.3	6946	79.3
1996	8227.9	1310	81.1	71.3	79.6	69.7	71.5	61.6	7222	82.2
1997	8571.6	1310	83.7	72.5	81.1	70.9	74.7	62.9	7488	85.5
1998	6585.5	1310	59.2	71.3	57.2	69.6	57.4	62.4	5334	60.9
1999	9705.0	1310	92.5	73.1	91.8	71.5	84.6	64.3	8284	94.6
2000	9088.3	1310	85.2	74.0	83.0	72.4	79.0	65.4	7626	86.8
2001	9142.7	1310	84.7	74.8	83.8	73.2	79.7	66.4	7580	86.5
2002	9011.0	1310	87.3	75.6	87.1	74.1	78.5	67.2	7738	88.3
2003	9974.4	1310	98.3	77.0	98.0	75.6	86.9	68.5	8621	98.4
2004	8535.3	1310	81.0	77.3	77.8	75.7	74.2	68.8	7152	81.4
2005	8534.4	1310	76.5	77.2	75.1	75.7	74.4	69.1	6803	77.7
2006	9284.8	1310	82.9	77.5	82.9	76.1	80.9	69.8	7331	83.7
2007	10831.8	1310	96.5	78.5	94.5	77.0	94.4	71.0	8484	96.8
2008	8553.3	1310	78.0	78.5	74.9	76.9	74.3	71.1	7052	80.3
2009	7309.0	1310	73.8	78.3	64.7	76.4	63.7	70.8	5871	67.0
2010	10382.4	1310	97.2	79.1	96.4	77.2	90.5	71.7	8482	96.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		200			529	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling				960	1	
D. Inspection, maintenance or repair without refuelling				72		
E. Testing of plant systems or components	1			63		2
H. Nuclear regulatory requirements					14	
J. Grid limitation, failure or grid unavailability					16	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					16	
L. Human factor related		11			8	1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			21			29
Z. Others			50		3	
Subtotal	1	211	71	1095	580	32
Total		283			1707	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		69
12. Reactor I&C Systems		63
13. Reactor Auxiliary Systems		1
14. Safety Systems		1
15. Reactor Cooling Systems		26
16. Steam generation systems		107
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries	1	53
32. Feedwater and Main Steam System		17
33. Circulating Water System		70
35. All other I&C Systems	24	0
41. Main Generator Systems	145	81
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems	30	
Total	200	493

FR-59 NOGENT-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1310.0 MW(e)
Design Net Capacity: 1310.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8055.2 GW(e).h
Energy Availability Factor: 73.7%
Load Factor: 70.2%
Operating Factor: 75.1%
Energy Unavailability Factor: 26.3%
Total Off-line Time: 2184 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	853.4	0.0	0.0	28.8	870.5	850.6	844.1	890.9	883.6	935.5	926.5	971.4	8055.2
EAF (%)	88.4	0.0	0.0	3.1	94.5	99.3	92.9	100.0	99.9	99.1	99.7	99.9	73.7
UCF (%)	88.4	0.0	0.0	3.1	94.5	99.3	92.9	100.0	99.9	99.2	100.0	99.9	73.7
LF (%)	87.6	0.0	0.0	3.1	89.3	90.2	86.6	91.4	93.7	95.9	98.2	99.7	70.2
OF (%)	93.5	0.0	0.0	8.3	99.2	100.0	93.3	100.0	100.0	99.3	100.0	100.0	75.1
EUf (%)	11.6	100.0	100.0	96.9	5.5	0.7	7.1	0.0	0.1	0.9	0.3	0.1	26.3
PUF (%)	7.0	100.0	100.0	95.2	2.9	0.4	0.0	0.0	0.0	0.0	0.0	0.1	24.9
UCLF (%)	4.6	0.0	0.0	1.7	2.6	0.3	7.1	0.0	0.1	0.7	0.0	0.0	1.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 01 Jan 1982 Lifetime Generation: 184823.3 GW(e).h
Date of First Criticality: 10 Apr 1988 Cumulative Energy Availability Factor: 79.8%
Date of Grid Connection: 14/12/1988 Cumulative Load Factor: 73.6%
Date of Commercial Operation: 05 Jan 1989 Cumulative Unit Capability Factor: 81.8%
Cumulative Energy Unavailability Factor: 20.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	5612.0	1310	78.9	78.9	78.9	78.9	72.8	72.8	4744	80.7
1990	7532.9	1310	69.4	73.2	68.3	72.6	65.6	68.5	6094	69.6
1991	8331.1	1310	78.8	75.3	73.5	72.9	72.6	70.1	7008	80.0
1992	8312.3	1310	77.4	75.9	74.1	73.2	72.2	70.7	6937	79.0
1993	9191.7	1310	85.9	78.0	80.8	74.8	80.1	72.7	7594	86.7
1994	6483.0	1310	98.0	81.5	94.8	78.4	56.5	69.8	6027	68.8
1995	7545.4	1310	78.4	81.1	75.9	78.0	65.8	69.2	6862	78.3
1996	8477.0	1310	80.5	81.0	77.0	77.9	73.7	69.8	7229	82.3
1997	8925.8	1310	86.0	81.6	82.0	78.3	77.8	70.7	7656	87.4
1998	8830.0	1310	98.0	83.3	97.8	80.3	76.9	71.4	7386	84.3
1999	7957.3	1310	76.2	82.6	74.7	79.8	69.3	71.2	6732	76.8
2000	9672.1	1310	85.9	82.9	84.6	80.2	84.1	72.3	7654	87.1
2001	9379.0	1310	85.1	83.1	83.4	80.5	81.7	73.0	7589	86.6
2002	8205.5	1310	84.2	83.2	84.2	80.7	71.5	72.9	7241	82.7
2003	9447.1	1310	91.5	83.7	91.5	81.5	82.3	73.6	7954	90.8
2004	8216.7	1310	78.6	83.4	75.1	81.1	71.4	73.4	7044	80.2
2005	8393.3	1310	77.2	83.0	76.1	80.8	73.1	73.4	6907	78.8
2006	10046.5	1310	89.5	83.4	89.5	81.3	87.5	74.2	7854	89.7
2007	9885.9	1310	89.5	83.7	86.9	81.6	86.1	74.8	7918	90.4
2008	7594.2	1310	68.8	83.0	67.0	80.8	66.0	74.4	6175	70.3
2009	7156.4	1310	67.3	82.2	66.0	80.1	62.4	73.8	6227	71.1
2010	8055.2	1310	73.7	81.8	73.7	79.8	70.2	73.6	6576	75.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		61			412	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	2123			812		
E. Testing of plant systems or components	2			22		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					47	
L. Human factor related					5	
Z. Others					1	
Subtotal	2125	61	0	834	466	0
Total		2186			1300	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		22
13. Reactor Auxiliary Systems		10
14. Safety Systems		32
15. Reactor Cooling Systems		19
16. Steam generation systems	50	35
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries	5	20
32. Feedwater and Main Steam System		10
33. Circulating Water System		38
35. All other I&C Systems		7
41. Main Generator Systems		190
42. Electrical Power Supply Systems		7
XX. Miscellaneous Systems	6	1
Total	61	400

FR-36 PALUEL-1

Operator: EDF (ELECTRICITE DE FRANCE)

Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1330.0 MW(e)
 Design Net Capacity: 1330.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8295.2 GW(e).h
 Energy Availability Factor: 74.6%
 Load Factor: 71.2%
 Operating Factor: 76.0%
 Energy Unavailability Factor: 25.4%
 Total Off-line Time: 2099 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	966.1	864.5	896.5	897.5	897.6	895.8	933.3	385.9	0.0	0.0	638.8	919.1	8295.2
EAF (%)	100.0	100.0	94.6	99.4	99.5	98.1	96.4	40.6	0.0	0.0	67.5	100.0	74.6
UCF (%)	100.0	100.0	94.6	99.4	100.0	100.0	100.0	41.9	0.0	24.7	67.5	100.0	77.2
LF (%)	97.6	96.7	90.7	93.7	90.7	93.5	94.3	39.0	0.0	0.0	66.7	92.9	71.2
OF (%)	100.0	100.0	95.4	100.0	100.0	100.0	100.0	42.2	0.0	0.0	76.4	100.0	76.0
EUUF (%)	0.0	0.0	5.4	0.6	0.5	1.9	3.6	59.4	100.0	100.0	32.5	0.0	25.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	58.1	100.0	16.1	8.0	0.0	15.2
UCLF (%)	0.0	0.0	5.4	0.6	0.0	0.0	0.0	0.0	0.0	59.2	24.5	0.0	7.6
XUF (%)	0.0	0.0	0.0	0.0	0.5	1.9	3.5	1.2	0.0	24.7	0.0	0.0	2.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 15/08/1977
 Date of First Criticality: 13/05/1984
 Date of Grid Connection: 22/06/1984
 Date of Commercial Operation: 12 Jan 1985

Lifetime Generation: 210418.9 GW(e).h
 Cumulative Energy Availability Factor: 76.0%
 Cumulative Load Factor: 70.3%
 Cumulative Unit Capability Factor: 78.5%
 Cumulative Energy Unavailability Factor: 24.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	947.5	1290	94.9	94.9	94.9	94.9	98.7	98.7	731	98.3
1986	5169.7	1290	52.3	55.7	50.2	53.7	45.7	49.9	4455	50.9
1987	8184.8	1330	77.0	66.0	76.6	64.9	70.3	59.8	6527	74.5
1988	9291.0	1330	96.8	76.1	95.3	74.8	79.5	66.3	7332	83.5
1989	7902.8	1330	72.6	75.3	70.4	73.7	67.8	66.7	6567	75.0
1990	7323.9	1330	70.1	74.2	66.4	72.3	62.9	65.9	6288	71.8
1991	7159.9	1330	66.7	73.0	63.2	70.8	61.5	65.2	5987	68.3
1992	8640.4	1330	76.6	73.5	76.6	71.6	74.0	66.4	6858	78.1
1993	8068.1	1330	77.2	74.0	70.9	71.5	69.2	66.8	6906	78.8
1994	6549.9	1330	77.1	74.3	76.9	72.1	56.2	65.6	5790	66.1
1995	8768.2	1330	82.2	75.1	79.6	72.9	75.3	66.6	7292	83.2
1996	5483.2	1330	52.7	73.1	48.7	70.7	46.9	64.8	4763	54.2
1997	9019.7	1330	84.5	74.0	83.8	71.8	77.4	65.8	7537	86.0
1998	9718.1	1330	91.3	75.3	91.2	73.3	83.4	67.2	8132	92.8
1999	8181.9	1330	78.6	75.6	76.2	73.5	70.2	67.4	6938	79.2
2000	9089.0	1330	84.0	76.1	83.5	74.1	77.8	68.1	7533	85.8
2001	9752.2	1330	98.3	77.5	97.6	75.6	83.7	69.1	8382	95.7
2002	7153.9	1330	68.3	77.0	66.6	75.1	61.4	68.6	6081	69.4
2003	8526.2	1330	77.6	77.0	77.2	75.2	73.2	68.9	6882	78.6
2004	8596.3	1330	79.4	77.1	77.4	75.3	73.6	69.1	7103	80.9
2005	10565.5	1330	98.4	78.2	97.9	76.4	90.7	70.2	8654	98.8
2006	7437.7	1330	68.6	77.7	66.0	75.9	63.8	69.9	6133	70.0
2007	8135.1	1330	75.1	77.6	73.3	75.8	69.8	69.9	6641	75.8
2008	9808.7	1330	91.1	78.2	90.3	76.4	84.0	70.5	8116	92.4
2009	7469.3	1330	86.1	78.5	66.5	76.0	64.1	70.2	6108	69.7
2010	8295.2	1330	77.2	78.5	74.6	76.0	71.2	70.3	6661	76.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		33			389	2
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	1270			993	52	
D. Inspection, maintenance or repair without refuelling				133		
E. Testing of plant systems or components				24	0	
H. Nuclear regulatory requirements					14	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					46	0
L. Human factor related					36	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			184			56
Z. Others		611			17	
Subtotal	1270	644	184	1150	556	59
Total		2098			1765	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		22
12. Reactor I&C Systems		50
13. Reactor Auxiliary Systems		36
14. Safety Systems		4
15. Reactor Cooling Systems		14
16. Steam generation systems		14
21. Fuel Handling and Storage Facilities		5
31. Turbine and auxiliaries	33	41
32. Feedwater and Main Steam System		33
33. Circulating Water System		19
35. All other I&C Systems		1
41. Main Generator Systems		115
42. Electrical Power Supply Systems		14
XX. Miscellaneous Systems		3
Total	33	371

FR-37 PALUEL-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1330.0 MW(e)
Design Net Capacity: 1330.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10210.0 GW(e).h
Energy Availability Factor: 96.0%
Load Factor: 87.6%
Operating Factor: 97.0%
Energy Unavailability Factor: 4.0%
Total Off-line Time: 264 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	737.2	823.4	913.4	869.4	858.9	794.5	880.8	794.3	784.9	908.7	904.0	940.4	10210.0
EAF (%)	80.2	99.9	100.0	99.0	96.5	88.2	97.0	98.2	96.4	97.5	99.3	100.0	96.0
UCF (%)	80.2	99.9	100.0	99.0	100.0	89.9	98.4	99.2	97.1	100.0	99.9	100.0	96.9
LF (%)	74.5	92.1	92.4	90.8	86.8	83.0	89.0	80.3	82.0	91.7	94.4	95.0	87.6
OF (%)	80.5	100.0	100.0	100.0	96.9	90.3	99.2	100.0	97.2	100.0	100.0	100.0	97.0
EUF (%)	19.8	0.1	0.0	1.0	3.5	11.8	3.0	1.8	3.6	2.5	0.7	0.0	4.0
PUF (%)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	19.8	0.0	0.0	1.0	0.0	10.1	1.5	0.8	2.9	0.0	0.1	0.0	3.0
XUF (%)	0.0	0.0	0.0	0.0	3.5	1.7	1.5	1.0	0.6	2.5	0.6	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 01 Jan 1978
Date of First Criticality: 08 Nov 1984
Date of Grid Connection: 14/09/1984
Date of Commercial Operation: 12 Jan 1985

Lifetime Generation: 207862.5 GW(e).h
Cumulative Energy Availability Factor: 74.7%
Cumulative Load Factor: 69.3%
Cumulative Unit Capability Factor: 76.8%
Cumulative Energy Unavailability Factor: 25.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	990.5	1290	99.6	99.6	99.6	99.6	103.2	103.2	744	100.0
1986	6040.9	1290	52.3	56.0	52.2	55.9	53.5	57.4	4804	54.8
1987	8859.6	1290	77.3	66.2	76.8	66.0	78.4	67.4	6837	78.0
1988	7725.0	1330	75.5	69.3	73.5	68.5	66.1	67.0	6017	68.5
1989	8956.4	1330	83.4	72.8	80.1	71.3	76.9	69.5	7358	84.0
1990	6496.3	1330	59.1	70.1	59.1	68.9	55.8	66.7	5328	60.8
1991	6140.3	1330	55.1	67.6	54.9	66.6	52.7	64.4	4996	57.0
1992	6906.9	1330	63.6	67.0	61.7	65.9	59.1	63.7	5618	64.0
1993	7954.4	1330	87.9	69.6	76.9	67.3	68.3	64.2	7217	82.4
1994	7115.2	1330	77.6	70.5	74.5	68.1	61.1	63.9	6671	76.2
1995	6934.5	1330	70.5	70.5	65.8	67.8	59.5	63.4	6252	71.4
1996	8407.4	1330	83.8	71.7	78.5	68.8	72.0	64.2	7195	81.9
1997	8139.8	1330	83.9	72.7	83.5	70.0	69.9	64.7	7182	82.0
1998	7300.4	1330	73.1	72.8	69.1	70.0	62.7	64.5	6583	75.1
1999	9243.8	1330	85.6	73.7	84.1	71.0	79.3	65.6	7705	88.0
2000	9849.9	1330	96.0	75.2	94.4	72.5	84.3	66.8	8271	94.2
2001	7843.1	1330	76.7	75.3	76.0	72.7	67.3	66.9	6861	78.3
2002	7984.4	1330	73.2	75.1	72.0	72.7	68.5	67.0	6569	75.0
2003	8814.9	1330	82.1	75.5	81.1	73.2	75.7	67.4	7490	85.5
2004	9562.7	1330	92.6	76.4	89.9	74.1	81.9	68.2	8039	91.5
2005	7246.4	1330	65.3	75.9	64.5	73.6	62.2	67.9	5823	66.5
2006	8143.5	1330	74.4	75.8	73.9	73.6	69.9	68.0	6673	76.2
2007	7558.0	1330	68.3	75.5	66.8	73.3	64.9	67.9	6021	68.7
2008	9315.6	1330	85.1	75.9	84.0	73.7	79.7	68.4	7595	86.5
2009	8393.4	1330	78.8	76.0	75.0	73.8	72.0	68.5	6815	77.8
2010	10210.0	1330	96.9	76.8	96.0	74.7	87.6	69.3	8496	97.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		241			645	2
B. Refuelling without a maintenance				60	5	
C. Inspection, maintenance or repair combined with refuelling				911	107	
D. Inspection, maintenance or repair without refuelling				43		
E. Testing of plant systems or components				18	1	
H. Nuclear regulatory requirements					8	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					22	0
L. Human factor related					6	
M. Governmental requirements or court decisions					1	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						6
Z. Others			23		19	
Subtotal	0	241	23	1032	814	8
Total		264			1854	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		19
12. Reactor I&C Systems		98
13. Reactor Auxiliary Systems		8
14. Safety Systems	145	21
15. Reactor Cooling Systems		75
16. Steam generation systems		31
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries	26	35
32. Feedwater and Main Steam System		7
33. Circulating Water System		68
35. All other I&C Systems		1
41. Main Generator Systems	70	216
42. Electrical Power Supply Systems		23
XX. Miscellaneous Systems		2
Total	241	611

FR-38 PALUEL-3

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1330.0 MW(e)
Design Net Capacity: 1330.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6850.0 GW(e).h
Energy Availability Factor: 60.6%
Load Factor: 58.8%
Operating Factor: 61.6%
Energy Unavailability Factor: 39.4%
Total Off-line Time: 3366 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	195.1	215.1	138.2	860.1	808.0	953.1	926.5	885.5	932.1	936.3	6850.0
EAF (%)	0.0	0.0	29.3	23.6	15.1	96.6	82.1	96.5	96.8	89.5	98.4	96.1	60.6
UCF (%)	0.0	0.0	29.3	23.6	15.3	99.9	84.5	100.0	100.0	91.7	98.9	96.1	61.9
LF (%)	0.0	0.0	19.7	22.5	14.0	89.8	81.7	96.3	96.8	89.4	97.3	94.6	58.8
OF (%)	0.0	0.0	22.5	23.8	15.9	100.0	84.8	100.0	100.0	92.3	99.4	96.6	61.6
EUF (%)	100.0	100.0	70.7	76.4	84.9	3.4	17.9	3.5	3.2	10.5	1.6	3.9	39.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
UCLF (%)	100.0	100.0	70.7	76.4	84.7	0.2	15.5	0.0	0.0	8.3	1.0	3.8	38.1
XUF (%)	0.0	0.0	0.0	0.0	0.2	3.3	2.4	3.4	3.2	2.2	0.5	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 02 Jan 1979 Lifetime Generation: 196306.5 GW(e).h
Date of First Criticality: 08 Jul 1985 Cumulative Energy Availability Factor: 72.3%
Date of Grid Connection: 30/09/1985 Cumulative Load Factor: 67.0%
Date of Commercial Operation: 02 Jan 1986 Cumulative Unit Capability Factor: 74.0%
Cumulative Energy Unavailability Factor: 27.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	7395.7	1290	72.1	72.1	72.1	72.1	71.5	71.5	5759	71.8
1987	7716.6	1290	78.4	75.4	78.3	75.3	68.3	69.8	6104	69.7
1988	6763.0	1330	68.7	73.0	59.2	69.7	57.9	65.6	5413	61.6
1989	8124.4	1330	70.7	72.4	70.2	69.8	69.7	66.7	6288	71.8
1990	7322.0	1330	67.2	71.4	66.2	69.1	62.8	65.9	6008	68.6
1991	9587.1	1330	86.5	73.9	86.3	72.0	82.3	68.7	7634	87.1
1992	6886.6	1330	63.2	72.4	63.0	70.7	58.9	67.3	5671	64.6
1993	8459.0	1330	77.5	73.0	73.4	71.0	72.6	68.0	6951	79.3
1994	6703.6	1330	63.4	71.9	61.8	70.0	57.5	66.8	5590	63.8
1995	8733.3	1330	85.6	73.3	84.1	71.4	75.0	67.6	7598	86.7
1996	8027.7	1330	84.9	74.4	84.6	72.6	68.7	67.7	7261	82.7
1997	7618.8	1330	73.2	74.3	72.8	72.6	65.4	67.5	6494	74.1
1998	8327.0	1330	77.6	74.5	76.1	72.9	71.5	67.8	6913	78.9
1999	7636.7	1330	76.1	74.7	73.7	73.0	65.5	67.7	6505	74.3
2000	9819.8	1330	94.7	76.0	94.4	74.4	84.1	68.8	8199	93.3
2001	7815.9	1330	81.6	76.4	79.6	74.7	67.1	68.7	6796	77.6
2002	8900.5	1330	82.3	76.7	80.4	75.1	76.4	69.1	7366	84.1
2003	8181.7	1330	74.9	76.6	74.3	75.0	70.2	69.2	6567	75.0
2004	6395.5	1330	57.0	75.6	56.0	74.0	54.7	68.4	5147	58.6
2005	8157.6	1330	76.9	75.6	73.1	74.0	70.0	68.5	6573	75.0
2006	10549.6	1330	98.6	76.7	96.8	75.1	90.5	69.6	8671	99.0
2007	3908.8	1330	36.3	74.9	34.8	73.2	33.5	67.9	3402	38.8
2008	10106.5	1330	98.0	75.9	96.6	74.3	86.5	68.7	8570	97.6
2009	4214.6	1330	42.7	74.5	38.8	72.8	36.2	67.4	3670	41.9
2010	6850.0	1330	61.9	74.0	60.6	72.3	58.8	67.0	5394	61.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		3298			814	
B. Refuelling without a maintenance				38	4	
C. Inspection, maintenance or repair combined with refuelling				926	37	
D. Inspection, maintenance or repair without refuelling				38		
E. Testing of plant systems or components				32	1	9
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability			69			0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	21
L. Human factor related					1	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						6
Z. Others					29	
Subtotal	0	3298	69	1034	893	36
Total		3367			1963	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		50
12. Reactor I&C Systems		76
13. Reactor Auxiliary Systems		40
14. Safety Systems		36
15. Reactor Cooling Systems		94
16. Steam generation systems		6
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		12
31. Turbine and auxiliaries		29
32. Feedwater and Main Steam System	30	70
33. Circulating Water System		50
35. All other I&C Systems		0
41. Main Generator Systems	2097	248
42. Electrical Power Supply Systems	1171	45
XX. Miscellaneous Systems		12
Total	3298	768

FR-39 PALUEL-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1330.0 MW(e)
 Design Net Capacity: 1330.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7709.5 GW(e).h
 Energy Availability Factor: 67.4%
 Load Factor: 66.2%
 Operating Factor: 69.5%
 Energy Unavailability Factor: 32.6%
 Total Off-line Time: 2675 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	939.7	851.7	960.5	915.7	436.9	0.0	0.0	0.0	735.0	961.6	934.6	973.8	7709.5
EAF (%)	98.2	99.9	99.9	97.1	44.4	0.0	0.0	0.0	76.8	97.2	99.0	100.0	67.4
UCF (%)	98.2	100.0	99.9	99.4	49.2	0.0	4.8	0.0	78.6	100.0	99.9	100.0	68.9
LF (%)	95.0	95.3	97.2	95.6	44.2	0.0	0.0	0.0	76.8	97.0	97.6	98.4	66.2
OF (%)	100.0	100.0	100.0	100.0	50.5	0.0	0.0	0.0	86.3	100.0	100.0	100.0	69.5
EUF (%)	1.8	0.1	0.1	2.9	55.6	100.0	100.0	100.0	23.2	2.8	1.0	0.0	32.6
PUF (%)	0.0	0.1	0.1	0.0	32.0	100.0	14.5	0.0	5.7	0.0	0.1	0.0	12.7
UCLF (%)	1.8	0.0	0.0	0.6	18.8	0.0	80.7	100.0	15.7	0.0	0.0	0.0	18.4
XUF (%)	0.0	0.0	0.0	2.3	4.8	0.0	4.8	0.0	1.8	2.7	0.9	0.0	1.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 02 Jan 1980
 Date of First Criticality: 29/03/1986
 Date of Grid Connection: 04 Nov 1986
 Date of Commercial Operation: 06 Jan 1986
 Lifetime Generation: 202467.6 GW(e).h
 Cumulative Energy Availability Factor: 76.1%
 Cumulative Load Factor: 70.4%
 Cumulative Unit Capability Factor: 77.9%
 Cumulative Energy Unavailability Factor: 23.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	5171.6	1300	85.7	85.7	85.2	85.2	78.0	78.0	4298	83.7
1987	8014.6	1290	69.8	75.7	69.7	75.5	70.9	73.6	6289	71.8
1988	5909.0	1330	54.0	67.1	53.6	66.8	50.6	64.5	4812	54.8
1989	8268.3	1330	72.1	68.5	71.0	68.0	71.0	66.3	6349	72.5
1990	8067.7	1330	78.7	70.8	78.5	70.3	69.2	67.0	6770	77.3
1991	8325.6	1330	74.5	71.5	74.2	71.0	71.5	67.8	6677	76.2
1992	5553.3	1330	48.9	68.0	48.6	67.6	47.5	64.7	4529	51.6
1993	8683.8	1330	77.8	69.3	75.3	68.6	74.5	66.0	6938	79.2
1994	8329.7	1330	77.3	70.2	76.5	69.5	71.5	66.6	6945	79.3
1995	8346.8	1330	88.5	72.1	88.1	71.5	71.6	67.2	7354	83.9
1996	7848.1	1330	75.2	72.4	72.4	71.6	67.2	67.2	6745	76.8
1997	8633.7	1330	81.9	73.3	78.2	72.1	74.1	67.8	7219	82.4
1998	7776.7	1330	71.2	73.1	68.3	71.8	66.7	67.7	6506	74.3
1999	9879.7	1330	96.1	74.8	94.6	73.5	84.8	68.9	8345	95.3
2000	8358.8	1330	86.0	75.6	84.4	74.3	71.5	69.1	7532	85.7
2001	8581.0	1330	84.5	76.1	82.1	74.8	73.7	69.4	7489	85.5
2002	9303.3	1330	95.7	77.3	92.7	75.9	79.9	70.0	8216	93.8
2003	7960.7	1330	82.8	77.6	81.9	76.2	68.3	69.9	7307	83.4
2004	7138.6	1330	67.9	77.1	64.6	75.6	61.1	69.5	6027	68.6
2005	9682.1	1330	93.3	77.9	89.2	76.3	83.1	70.2	7949	90.7
2006	8270.8	1330	81.4	78.1	77.2	76.3	71.0	70.2	7320	83.6
2007	8421.5	1330	76.8	78.0	73.7	76.2	72.3	70.3	6824	77.9
2008	7962.6	1330	70.8	77.7	69.6	75.9	68.2	70.2	6286	71.6
2009	9337.1	1330	91.4	78.3	88.9	76.5	80.1	70.6	7944	90.7
2010	7709.5	1330	68.9	77.9	67.4	76.1	66.2	70.4	6085	69.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		130			545	1
B. Refuelling without a maintenance				52	3	
C. Inspection, maintenance or repair combined with refuelling	1066			922	12	
D. Inspection, maintenance or repair without refuelling				35		
E. Testing of plant systems or components				19	0	
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	1
L. Human factor related					12	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			36			0
Z. Others		1443			16	1
Subtotal	1066	1573	36	1028	615	8
Total		2675			1651	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		88
12. Reactor I&C Systems	27	38
13. Reactor Auxiliary Systems		8
14. Safety Systems		15
15. Reactor Cooling Systems		34
16. Steam generation systems		68
21. Fuel Handling and Storage Facilities		57
31. Turbine and auxiliaries	103	35
32. Feedwater and Main Steam System		14
33. Circulating Water System		1
41. Main Generator Systems		114
42. Electrical Power Supply Systems		33
XX. Miscellaneous Systems		18
Total	130	523

FR-63 PENLY-1

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1330.0 MW(e)
 Design Net Capacity: 1330.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6627.3 GW(e).h
 Energy Availability Factor: 59.2%
 Load Factor: 56.9%
 Operating Factor: 60.3%
 Energy Unavailability Factor: 40.8%
 Total Off-line Time: 3480 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	847.4	874.1	957.1	674.2	0.0	595.7	923.8	844.5	358.9	0.0	0.0	551.4	6627.3
EAF (%)	86.9	99.9	100.0	72.8	0.0	63.6	99.9	92.2	41.1	0.0	0.0	56.5	59.2%
UCF (%)	86.9	99.9	100.0	72.8	0.0	68.1	99.9	95.9	43.5	3.2	0.0	56.5	60.4
LF (%)	85.6	97.8	96.8	70.4	0.0	62.2	93.4	85.3	37.5	0.0	0.0	55.7	56.9
OF (%)	88.0	100.0	100.0	72.9	0.0	70.0	100.0	93.0	44.2	0.0	0.0	57.4	60.3
EUf (%)	13.1	0.1	0.0	27.2	100.0	36.4	0.1	7.8	58.9	100.0	100.0	43.5	40.8
PUF (%)	0.0	0.1	0.0	0.0	96.5	17.2	0.0	0.0	0.0	0.0	0.0	0.0	9.6
UCLF (%)	13.1	0.0	0.0	27.1	3.5	14.8	0.1	4.1	56.5	96.8	100.0	43.5	30.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	4.4	0.0	3.7	2.4	3.2	0.0	0.0	1.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 09 Jan 1982 Lifetime Generation: 178460.2 GW(e).h
 Date of First Criticality: 04 Jan 1990 Cumulative Energy Availability Factor: 80.8%
 Date of Grid Connection: 05 Apr 1990 Cumulative Load Factor: 75.5%
 Date of Commercial Operation: 12 Jan 1990 Cumulative Unit Capability Factor: 82.2%
 Cumulative Energy Unavailability Factor: 19.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]	Cumul.	Factor [%]	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	971.2	1330	98.9	98.9	98.9	98.9	98.2	98.2	738	99.2
1991	8436.7	1330	74.3	76.2	74.2	76.2	72.4	74.4	6645	75.9
1992	7922.2	1330	71.2	73.8	70.9	73.6	67.8	71.2	6315	71.9
1993	8023.9	1330	84.6	77.3	71.9	73.1	68.9	70.5	7298	83.3
1994	7969.1	1330	86.1	79.5	85.0	76.0	68.4	70.0	6654	76.0
1995	8879.1	1330	81.9	79.9	80.8	76.9	76.2	71.2	7248	82.7
1996	9530.8	1330	85.7	80.9	85.2	78.3	81.6	72.9	7625	86.8
1997	8503.4	1330	77.5	80.4	76.7	78.1	73.0	72.9	6872	78.4
1998	9965.7	1330	98.0	82.6	97.9	80.5	85.5	74.5	8140	92.9
1999	7998.5	1330	74.4	81.7	71.5	79.5	68.7	73.8	6633	75.7
2000	8271.7	1330	73.8	80.9	73.7	79.0	70.8	73.5	6640	75.6
2001	9825.8	1330	98.7	82.5	98.4	80.7	84.3	74.5	8304	94.8
2002	7146.7	1330	67.2	81.2	66.9	79.6	61.3	73.4	5948	67.9
2003	9290.8	1330	84.6	81.5	84.6	80.0	79.7	73.9	7525	85.9
2004	10500.2	1330	98.9	82.7	98.6	81.3	89.9	75.0	8733	99.4
2005	8491.3	1330	79.1	82.5	76.9	81.0	72.9	74.9	7104	81.1
2006	9533.1	1330	86.1	82.7	83.6	81.1	81.8	75.3	7656	87.4
2007	9243.6	1330	82.7	82.7	82.1	81.2	79.3	75.6	7356	84.0
2008	10743.3	1330	95.5	83.4	95.2	82.0	92.0	76.5	8424	95.9
2009	8878.5	1330	81.8	83.3	80.5	81.9	76.2	76.5	7217	82.4
2010	6627.3	1330	60.4	82.2	59.2	80.8	56.9	75.5	5280	60.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2548			274	0
B. Refuelling without a maintenance	816				2	
C. Inspection, maintenance or repair combined with refuelling				814	1	
D. Inspection, maintenance or repair without refuelling				184		
E. Testing of plant systems or components	0			21		
H. Nuclear regulatory requirements					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	0
L. Human factor related					2	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			40			1
Z. Others		50			0	
Subtotal	816	2598	40	1019	285	1
Total		3454			1305	

7. Equipment Related Full Outages, Analysis by System

System	2010	1990 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	16	36
12. Reactor I&C Systems	240	9
13. Reactor Auxiliary Systems		21
14. Safety Systems		13
15. Reactor Cooling Systems	36	43
16. Steam generation systems		39
17. Safety I&C Systems (excluding reactor I&C)		4
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries	234	25
32. Feedwater and Main Steam System	62	19
33. Circulating Water System		2
41. Main Generator Systems	1960	28
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems		2
Total	2548	249

FR-64 PENLY-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1330.0 MW(e)
Design Net Capacity: 1330.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9987.0 GW(e).h
Energy Availability Factor: 96.5%
Load Factor: 85.7%
Operating Factor: 97.8%
Energy Unavailability Factor: 3.5%
Total Off-line Time: 189 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	881.2	794.1	895.3	864.1	795.3	746.6	847.0	676.4	785.9	880.5	891.1	929.6	9987.0
EAF (%)	93.0	91.7	99.2	99.3	96.9	97.3	99.6	89.1	97.1	97.0	99.6	98.2	96.5
UCF (%)	93.0	91.7	99.2	99.3	97.0	99.7	99.8	95.5	99.7	99.7	99.6	98.2	97.7
LF (%)	89.1	88.8	90.6	90.2	80.4	78.0	85.6	68.4	82.1	88.9	93.1	93.9	85.7
OF (%)	93.5	93.6	99.7	100.0	97.7	100.0	100.0	89.4	100.0	100.0	100.0	100.0	97.8
EUf (%)	7.0	8.3	0.8	0.7	3.1	2.7	0.4	10.9	2.9	3.0	0.4	1.8	3.5
PUF (%)	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	6.8	8.2	0.8	0.7	3.1	0.3	0.2	4.5	0.3	0.3	0.4	1.8	2.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	2.4	0.2	6.4	2.6	2.7	0.0	0.0	1.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 08 Jan 1984 Lifetime Generation: 166351.7 GW(e).h
Date of First Criticality: 01 Oct 1992 Cumulative Energy Availability Factor: 83.5%
Date of Grid Connection: 02 Apr 1992 Cumulative Load Factor: 77.1%
Date of Commercial Operation: 11 Jan 1992 Cumulative Unit Capability Factor: 84.8%
Cumulative Energy Unavailability Factor: 16.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1992	1970.8	1330	100.0	100.0	100.0	100.0	101.2	101.2	1464	100.0
1993	8611.8	1330	75.2	78.7	74.4	78.1	73.9	77.8	6658	76.0
1994	8759.7	1330	81.3	79.9	77.6	77.8	75.2	76.6	7228	82.5
1995	8169.7	1330	74.0	78.0	73.8	76.6	70.1	74.6	6574	75.0
1996	9758.0	1330	91.3	81.2	89.3	79.6	83.5	76.7	8025	91.4
1997	8068.9	1330	84.3	81.8	82.9	80.3	69.3	75.3	7186	82.0
1998	8877.5	1330	82.9	82.0	81.1	80.4	76.2	75.4	7318	83.5
1999	8637.0	1330	81.3	81.9	79.4	80.2	74.1	75.2	7203	82.2
2000	9584.5	1330	97.1	83.8	96.8	82.3	82.0	76.1	8393	95.5
2001	8816.2	1330	82.1	83.6	80.2	82.1	75.7	76.0	7333	83.7
2002	8464.3	1330	79.1	83.1	79.0	81.8	72.6	75.7	6890	78.7
2003	10207.8	1330	97.6	84.4	97.6	83.2	87.6	76.8	8603	98.2
2004	7225.8	1330	69.2	83.2	69.1	82.0	61.9	75.5	6231	70.9
2005	9102.6	1330	84.8	83.3	84.0	82.2	78.1	75.7	7546	86.1
2006	9885.2	1330	97.7	84.3	97.0	83.2	84.8	76.4	8447	96.4
2007	8718.7	1330	79.4	84.0	76.7	82.8	74.8	76.3	7081	80.8
2008	9474.9	1330	86.1	84.1	85.0	82.9	81.1	76.6	7590	86.4
2009	8954.2	1330	82.0	84.0	80.3	82.8	76.9	76.6	7258	82.9
2010	9987.0	1330	97.7	84.8	96.5	83.5	85.7	77.1	8571	97.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1992 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		126			413	
B. Refuelling without a maintenance				40	0	
C. Inspection, maintenance or repair combined with refuelling				803		
E. Testing of plant systems or components				44		
H. Nuclear regulatory requirements					17	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
L. Human factor related		15			1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			48			1
Z. Others					0	
Subtotal	0	141	48	887	436	2
Total		189			1325	

7. Equipment Related Full Outages, Analysis by System

System	2010	1992 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		37
12. Reactor I&C Systems		23
13. Reactor Auxiliary Systems		14
14. Safety Systems		11
15. Reactor Cooling Systems		44
16. Steam generation systems		13
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries	52	40
32. Feedwater and Main Steam System		19
33. Circulating Water System		0
35. All other I&C Systems	17	
41. Main Generator Systems	57	1
42. Electrical Power Supply Systems		167
XX. Miscellaneous Systems		9
Total	126	380

FR-10 PHENIX

Operator: CEA/EDF (Commissariat à l'Energie Atomique (80%))
Contractor: CNCLNEY (CNIM-CONSTRUCTIONS NAVALES ET INDUSTRIELLES DE MEDITERRANEE CL - CREUSOT LOIRE , NE

1. Station Details

Type: FBR
Net Reference Unit Power (RUP at the beginning of 2010): 130.0 MW(e)
Design Net Capacity: 233.0 MW(e)
Design Discharge Burnup: 100000 MW.d/t
Status at end of year: Permanent Shutdown

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 768 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0											0.0
EAF (%)	0.0	0.0											0.0
UCF (%)	0.0	0.0											0.0
LF (%)	0.0	0.0											0.0
OF (%)	0.0	0.0											0.0
EUF (%)	100.0	100.0											100.0
PUF (%)	100.0	100.0											100.0
UCLF (%)	0.0	0.0											0.0
XUF (%)	0.0	0.0											0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN JANUARY, FROM THE 27TH, THE LAST PART OF THE LAST FINAL TEST ABOUT CORE FLOWERING TOOK PLACE. ON MONDAY FEBRUARY 1ST, 2010 AT 17H30 THE PHENIX REACTOR STOPPED FOR EVER. THAT WAS DONE WITH A MANUAL SCRAM: TWO PEOPLE PRESSED THE 2 BUTTONS. ONE WAS THE NORMAL OPERATOR IN HIS SHIFT AND THE OTHER ONE WAS THE OPERATOR, NOW RETIRED FOR A LONG TIME, WHO MADE THE REACTOR CRITICAL FOR THE VERY FIRST TIME ON AUGUST 31ST, 1973. THE LOOP IS CLOSED.

5. Historical Summary

Date of Construction Start: 11 Jan 1968 **Lifetime Generation:** 24440.4 GW(e).h
Date of First Criticality: 31/08/1973 **Cumulative Energy Availability Factor:** 46.3%
Date of Grid Connection: 13/12/1973 **Cumulative Load Factor:** 40.5%
Date of Commercial Operation: 14/07/1974 **Cumulative Unit Capability Factor:** 46.5%
Date of Shutdown: 02 Jan 2010 **Cumulative Energy Unavailability Factor:** 53.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1974	735.6	233	71.6	71.6	71.5	71.5	71.5	71.5	71.5	71.5	3515	79.6
1975	1308.4	233	64.1	66.6	64.1	66.6	64.1	66.6	64.1	66.6	5932	67.7
1976	950.8	233	47.4	58.9	46.7	58.6	46.5	58.5	46.5	58.5	4799	54.6
1977	300.8	233	15.9	46.6	15.5	46.3	14.7	46.0	14.7	46.0	2120	24.2
1978	1238.8	233	61.4	49.9	60.9	49.6	60.7	49.3	60.7	49.3	5905	67.4
1979	1719.0	233	84.0	56.1	84.0	55.8	84.2	55.6	84.2	55.6	7350	83.9
1980	1319.0	233	64.7	57.4	64.7	57.2	64.4	57.0	64.4	57.0	5679	64.7
1981	1421.9	233	69.9	59.1	69.9	58.9	69.7	58.7	69.7	58.7	6217	71.0
1982	989.1	233	48.7	57.9	48.7	57.7	48.5	57.5	48.5	57.5	5429	62.0
1983	1122.0	233	55.1	57.6	55.1	57.4	55.0	57.2	55.0	57.2	5515	63.0
1984	1414.0	233	53.7	57.2	53.7	57.0	69.1	58.3	69.1	58.3	6206	70.7
1985	1153.0	233	60.4	57.5	60.4	57.3	56.5	58.2	56.5	58.2	6784	77.4
1986	1519.1	233	73.2	58.7	73.2	58.6	74.4	59.5	74.4	59.5	6996	79.9
1987	1556.4	233	75.3	60.0	71.5	59.6	76.3	60.7	76.3	60.7	7059	80.6
1988	1475.4	233	72.0	60.8	71.4	60.4	72.1	61.5	72.1	61.5	6300	71.7
1989	601.2	233	30.4	58.8	29.6	58.4	29.5	59.4	29.5	59.4	2678	30.6
1990	982.5	233	47.9	58.2	47.9	57.8	48.1	58.8	48.1	58.8	4637	52.9
1991	0.0	233	58.6	58.2	58.6	57.8	0.0	55.4	0.0	55.4	0	0.0
1992	0.0	233	0.0	55.0	0.0	54.7	0.0	52.4	0.0	52.4	0	0.0
1993	34.8	233	94.1	57.1	94.1	56.7	1.7	49.8	1.7	49.8	286	3.3
1994	22.6	233	17.1	55.1	17.1	54.8	1.1	47.4	1.1	47.4	184	2.1
1995			Data not provided									
1996	2.7	233	0.0	52.5	0.0	52.2	0.1	45.2	0.1	45.2	0	0.0
1997	0.0	130	0.0	51.2	0.0	50.9	0.0	44.1	0.0	44.1	0	0.0
1998	382.2	130	58.6	51.4	58.6	51.1	33.6	43.8	33.6	43.8	3019	34.5
1999	0.0	130	0.0	50.2	0.0	49.9	0.0	42.8	0.0	42.8	0	0.0
2000	0.0	130	0.0	49.0	0.0	48.7	0.0	41.8	0.0	41.8	0	0.0
2001	0.0	130	0.0	47.9	0.0	47.6	0.0	40.8	0.0	40.8	0	0.0
2002	0.0	130	0.0	46.8	0.0	46.5	0.0	39.9	0.0	39.9	0	0.0
2003	61.8	130	6.2	45.9	6.2	45.6	5.4	39.1	5.4	39.1	711	8.1
2004	626.9	130	55.1	46.1	55.1	45.8	54.9	39.5	54.9	39.5	4888	55.6
2005	804.5	130	71.8	46.6	71.2	46.4	70.6	40.1	70.6	40.1	6341	72.4
2006	591.0	130	51.9	46.7	51.9	46.5	51.9	40.4	51.9	40.4	4601	52.5
2007	565.1	130	49.6	46.8	49.6	46.5	49.6	40.6	49.6	40.6	4452	50.8
2008	664.6	130	61.7	47.1	60.2	46.8	58.2	40.9	60.2	40.9	5312	60.5
2009	246.0	130	22.8	46.6	22.5	46.3	21.6	40.5	21.6	40.5	1999	22.8
2010	0.0	130	0.0	46.5	0.0	46.3	0.0	40.5	0.0	40.5	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					1042	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				764		
D. Inspection, maintenance or repair without refuelling	761			249	10	
E. Testing of plant systems or components					4	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				1304		
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	2
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	761	0	0	2317	1062	7
Total		761			3386	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		63
12. Reactor I&C Systems		67
14. Safety Systems		0
15. Reactor Cooling Systems		230
16. Steam generation systems		242
21. Fuel Handling and Storage Facilities		59
31. Turbine and auxiliaries		95
32. Feedwater and Main Steam System		74
33. Circulating Water System		1
41. Main Generator Systems		26
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems		169
Total	0	1034

FR-48 ST. ALBAN-1

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1335.0 MW(e)
 Design Net Capacity: 1335.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10759.9 GW(e).h
 Energy Availability Factor: 92.3%
 Load Factor: 92.0%
 Operating Factor: 96.6%
 Energy Unavailability Factor: 7.7%
 Total Off-line Time: 295 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	935.2	892.9	943.7	898.6	930.1	897.9	894.3	960.2	934.9	597.1	897.7	977.3	10759.9
EAF (%)	94.6	100.0	95.1	94.0	94.0	93.4	90.4	96.7	97.5	60.3	93.9	99.1	92.3
UCF (%)	94.6	100.0	95.1	94.1	94.5	94.7	94.2	98.8	98.8	60.6	93.9	99.1	93.1
LF (%)	94.2	99.5	95.1	93.5	93.6	93.4	90.0	96.7	97.3	60.0	93.4	98.4	92.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	62.8	97.5	100.0	96.6
EUf (%)	5.4	0.0	4.9	6.0	6.0	6.6	9.6	3.3	2.5	39.7	6.1	0.9	7.7
PUF (%)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
UCLF (%)	5.4	0.0	4.8	5.8	5.5	5.3	5.8	1.2	1.2	39.4	6.0	0.9	6.9
XUF (%)	0.0	0.0	0.0	0.1	0.5	1.3	3.8	2.1	1.2	0.3	0.0	0.0	0.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 29/01/1979 Lifetime Generation: 196722.0 GW(e).h
 Date of First Criticality: 08 Apr 1985 Cumulative Energy Availability Factor: 74.6%
 Date of Grid Connection: 30/08/1985 Cumulative Load Factor: 67.0%
 Date of Commercial Operation: 05 Jan 1986 Cumulative Unit Capability Factor: 76.2%
 Cumulative Energy Unavailability Factor: 25.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	3909.9	1300	67.6	67.6	66.4	66.4	51.1	51.1	3182	54.1
1987	6101.6	1300	56.6	61.0	56.2	60.3	53.6	52.6	4944	56.4
1988	4562.0	1335	83.4	69.6	82.4	68.7	38.9	47.4	3721	42.4
1989	6781.3	1335	70.7	69.9	63.5	67.3	58.0	50.3	5907	67.4
1990	7799.1	1335	70.4	70.0	68.6	67.6	66.7	53.8	6295	71.9
1991	7935.3	1335	74.4	70.8	73.3	68.6	67.9	56.3	6380	72.8
1992	4812.2	1335	42.1	66.4	42.1	64.6	41.0	54.0	3775	43.0
1993	7376.0	1335	68.2	66.7	65.7	64.7	63.1	55.2	6010	68.6
1994	7575.6	1335	94.5	69.9	93.8	68.1	64.8	56.3	6777	77.4
1995	8535.7	1335	81.1	71.1	78.2	69.2	73.0	58.0	7197	82.2
1996	8126.6	1335	83.7	72.2	83.1	70.5	69.3	59.1	6950	79.1
1997	7112.8	1335	65.5	71.7	63.6	69.9	60.8	59.3	5833	66.6
1998	8255.9	1335	90.6	73.2	89.9	71.5	70.6	60.2	6802	77.6
1999	9240.6	1335	86.3	74.1	85.7	72.5	79.0	61.5	7656	87.4
2000	8027.8	1335	72.2	74.0	71.4	72.4	68.5	62.0	6494	73.9
2001	9298.5	1335	89.8	75.0	89.6	73.5	79.5	63.1	7843	89.5
2002	8768.8	1335	81.0	75.4	79.6	73.9	75.0	63.8	7275	83.0
2003	8691.9	1335	80.6	75.7	78.0	74.1	74.3	64.4	7029	80.2
2004	10127.4	1335	96.6	76.8	95.3	75.3	86.4	65.6	8283	94.3
2005	9697.0	1335	88.6	77.4	86.0	75.8	82.9	66.5	7949	90.7
2006	8882.1	1335	82.5	77.6	78.4	75.9	76.0	67.0	7342	83.8
2007	6342.0	1335	55.9	76.6	54.6	74.9	54.2	66.4	4987	56.9
2008	5610.2	1335	49.3	75.4	49.2	73.8	47.8	65.5	4577	52.1
2009	8681.8	1335	76.7	75.5	74.6	73.8	74.2	65.9	6881	78.6
2010	10759.9	1335	93.1	76.2	92.3	74.6	92.0	67.0	8465	96.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		295			711	
B. Refuelling without a maintenance				59	3	
C. Inspection, maintenance or repair combined with refuelling				950	8	
D. Inspection, maintenance or repair without refuelling				62	0	
E. Testing of plant systems or components				26		
H. Nuclear regulatory requirements					54	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					27	1
L. Human factor related					1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						4
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						3
Z. Others					2	0
Subtotal	0	295	0	1097	806	8
Total		295			1911	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		50
12. Reactor I&C Systems	18	20
13. Reactor Auxiliary Systems		17
14. Safety Systems		11
15. Reactor Cooling Systems		109
16. Steam generation systems		5
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries	277	105
32. Feedwater and Main Steam System		48
33. Circulating Water System		2
35. All other I&C Systems		2
41. Main Generator Systems		215
42. Electrical Power Supply Systems		59
XX. Miscellaneous Systems		19
Total	295	669

FR-49 ST. ALBAN-2

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1335.0 MW(e)
 Design Net Capacity: 1335.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8297.5 GW(e).h
 Energy Availability Factor: 73.0%
 Load Factor: 71.0%
 Operating Factor: 76.0%
 Energy Unavailability Factor: 27.0%
 Total Off-line Time: 2101 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	978.0	833.2	962.9	921.7	934.5	849.0	887.9	908.6	906.8	28.7	0.0	86.2	8297.5
EAF (%)	99.2	94.4	99.5	99.3	99.0	93.5	91.0	93.9	97.0	2.9	0.0	8.7	73.0
UCF (%)	99.2	94.4	99.6	99.4	99.5	95.7	95.4	99.2	99.2	2.9	20.0	11.9	76.2
LF (%)	98.5	92.9	97.1	95.9	94.1	88.3	89.4	91.5	94.3	2.9	0.0	8.7	71.0
OF (%)	100.0	100.0	100.0	100.0	100.0	96.4	95.7	100.0	100.0	3.5	0.0	18.8	76.0
EUf (%)	0.8	5.6	0.5	0.7	1.0	6.5	9.0	6.1	3.0	97.1	100.0	91.3	27.0
PUF (%)	0.1	0.0	0.1	0.2	0.0	0.0	0.1	0.1	0.0	96.9	63.3	6.4	14.0
UCLF (%)	0.8	5.6	0.4	0.5	0.4	4.3	4.6	0.7	0.8	0.2	16.7	81.7	9.8
XUF (%)	0.0	0.0	0.0	0.1	0.5	2.2	4.4	5.3	2.2	0.0	20.0	3.2	3.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 31/07/1979
 Date of First Criticality: 06 Jul 1986
 Date of Grid Connection: 07 Mar 1986
 Date of Commercial Operation: 03 Jan 1987

Lifetime Generation: 186315.2 GW(e).h
 Cumulative Energy Availability Factor: 73.9%
 Cumulative Load Factor: 66.1%
 Cumulative Unit Capability Factor: 76.5%
 Cumulative Energy Unavailability Factor: 26.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	5639.8	1300	79.1	79.1	79.0	79.0	59.1	59.1	5014	68.3
1988	5185.0	1335	47.3	61.5	46.5	61.1	44.2	50.9	4308	49.0
1989	6126.5	1335	57.5	60.1	56.2	59.4	52.4	51.4	4806	54.9
1990	6070.6	1335	60.3	60.1	56.5	58.6	51.9	51.5	5146	58.7
1991	7962.6	1335	73.3	62.9	71.1	61.2	68.1	55.0	6484	74.0
1992	6375.1	1335	64.3	63.1	62.3	61.4	54.4	54.9	5405	61.5
1993	6433.1	1335	90.9	67.2	83.1	64.6	55.0	54.9	6121	69.9
1994	7125.8	1335	74.9	68.2	73.0	65.7	60.9	55.7	6074	69.3
1995	7751.4	1335	76.1	69.1	72.7	66.5	66.3	56.9	6763	77.2
1996	8344.6	1335	81.5	70.3	79.7	67.8	71.2	58.3	7247	82.5
1997	8049.7	1335	92.3	72.4	91.8	70.0	68.8	59.3	7072	80.7
1998	6555.7	1335	66.7	71.9	63.2	69.4	56.1	59.0	5654	64.5
1999	8607.0	1335	80.3	72.6	79.3	70.2	73.6	60.2	7188	82.1
2000	8729.6	1335	86.5	73.6	79.0	70.9	74.4	61.2	7202	82.0
2001	8654.8	1335	91.4	74.8	91.3	72.2	74.0	62.1	7657	87.4
2002	8290.6	1335	77.3	74.9	75.2	72.4	70.9	62.6	6950	79.3
2003	9254.8	1335	87.8	75.7	83.0	73.1	79.1	63.6	7558	86.3
2004	10476.5	1335	97.8	76.9	97.7	74.4	89.3	65.0	8709	99.1
2005	7238.0	1335	70.6	76.6	65.2	73.9	61.9	64.9	6361	72.6
2006	7584.2	1335	69.1	76.2	67.4	73.6	64.9	64.9	6292	71.8
2007	10476.0	1335	95.6	77.2	95.0	74.6	89.6	66.1	8660	98.9
2008	6270.9	1335	58.1	76.3	54.7	73.7	53.5	65.5	5320	60.6
2009	8753.2	1335	81.8	76.5	78.4	73.9	74.8	65.9	7052	80.5
2010	8297.5	1335	76.2	76.5	73.0	73.9	71.0	66.1	6659	76.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		726			706	
B. Refuelling without a maintenance				25	4	
C. Inspection, maintenance or repair combined with refuelling	1175			914	26	
D. Inspection, maintenance or repair without refuelling				78		
E. Testing of plant systems or components				56	1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	28
L. Human factor related		24			3	0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			24			8
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			144			9
Z. Others					2	0
Subtotal	1175	750	168	1073	753	45
Total		2093			1871	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		55
12. Reactor I&C Systems	50	58
13. Reactor Auxiliary Systems		12
14. Safety Systems	162	3
15. Reactor Cooling Systems	24	48
16. Steam generation systems		108
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries	250	113
32. Feedwater and Main Steam System		45
33. Circulating Water System		1
35. All other I&C Systems		1
41. Main Generator Systems		157
42. Electrical Power Supply Systems		40
XX. Miscellaneous Systems	240	3
Total	726	645

FR-17 ST. LAURENT-B-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 915.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6802.1 GW(e).h
Energy Availability Factor: 84.9%
Load Factor: 84.9%
Operating Factor: 90.9%
Energy Unavailability Factor: 15.1%
Total Off-line Time: 793 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	669.3	596.1	616.6	611.8	567.6	179.2	340.4	651.5	603.9	644.3	644.9	676.6	6802.1
EAF (%)	98.3	97.0	90.7	92.9	83.4	27.2	50.1	95.7	91.8	94.5	97.9	99.4	84.9
UCF (%)	99.8	99.3	94.0	100.0	99.9	36.9	53.7	99.9	94.9	99.7	99.8	99.9	89.8
LF (%)	98.3	96.9	90.7	92.9	83.4	27.2	50.0	95.7	91.7	94.5	97.9	99.4	84.9
OF (%)	100.0	99.6	94.9	100.0	100.0	36.9	62.0	100.0	97.9	100.0	100.0	100.0	90.9
EUf (%)	1.7	3.0	9.3	7.1	16.6	72.8	49.9	4.3	8.2	5.5	2.1	0.6	15.1
PUF (%)	0.2	0.2	0.0	0.0	0.1	63.1	21.4	0.1	0.3	0.2	0.1	0.1	7.1
UCLF (%)	0.0	0.4	5.9	0.0	0.0	0.0	24.9	0.1	4.8	0.2	0.1	0.0	3.1
XUF (%)	1.5	2.4	3.3	7.1	16.4	9.7	3.6	4.2	3.1	5.1	1.9	0.5	4.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 05 Jan 1976 Lifetime Generation: 161714.5 GW(e).h
Date of First Criticality: 01 Apr 1981 Cumulative Energy Availability Factor: 76.7%
Date of Grid Connection: 21/01/1981 Cumulative Load Factor: 73.2%
Date of Commercial Operation: 08 Jan 1983 Cumulative Unit Capability Factor: 78.5%
Cumulative Energy Unavailability Factor: 23.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2970.0	880	92.0	92.0	92.0	92.0	91.9	91.9	3447	93.8
1984	4401.0	880	56.0	66.6	56.0	66.6	56.9	67.2	5042	57.4
1985	5630.4	880	76.1	70.5	75.0	70.1	73.0	69.6	6827	77.9
1986	5476.4	880	79.8	73.2	79.7	72.9	71.0	70.0	7144	81.6
1987	5171.3	880	76.8	74.0	76.1	73.6	67.1	69.4	6667	76.1
1988	5721.0	915	76.3	74.5	75.9	74.1	71.2	69.7	6464	73.6
1989	6609.8	915	85.4	76.2	82.7	75.4	82.5	71.8	7699	87.9
1990	6113.7	915	86.3	77.6	84.1	76.6	76.3	72.4	7089	80.9
1991	4005.4	915	53.7	74.7	52.3	73.7	50.0	69.7	4736	54.1
1992	5621.1	915	75.4	74.8	74.0	73.7	69.9	69.7	6690	76.2
1993	5668.5	915	75.3	74.8	72.4	73.6	70.7	69.8	6821	77.9
1994	6095.7	915	87.0	75.9	85.1	74.6	76.1	70.4	7252	82.8
1995	4443.0	915	64.3	75.0	60.3	73.4	55.4	69.1	5211	59.5
1996	5541.1	915	79.1	75.3	78.8	73.9	68.9	69.1	6888	78.4
1997	5132.6	915	76.2	75.3	75.4	74.0	64.0	68.8	6404	73.1
1998	6030.7	915	84.6	75.9	82.1	74.5	75.2	69.2	7366	84.1
1999	5062.6	915	69.7	75.6	67.9	74.1	63.2	68.8	6207	70.9
2000	5086.7	915	66.4	75.0	66.0	73.6	63.3	68.5	5957	67.8
2001	6814.8	915	86.8	75.7	86.4	74.3	85.0	69.4	7735	88.3
2002	6637.0	890	85.2	76.2	82.9	74.8	85.1	70.2	7592	86.7
2003	6630.4	915	86.5	76.7	82.8	75.2	82.7	70.8	7658	87.4
2004	6364.2	915	82.4	76.9	80.4	75.4	79.2	71.2	7356	83.7
2005	5384.1	915	69.5	76.6	68.1	75.1	67.2	71.0	6186	70.6
2006	6914.1	915	88.9	77.1	88.2	75.6	86.3	71.7	7973	91.0
2007	6426.7	915	83.1	77.4	80.5	75.8	80.2	72.0	7380	84.2
2008	6894.1	915	90.8	77.9	88.6	76.3	85.8	72.6	8034	91.5
2009	6241.5	915	83.2	78.1	78.4	76.4	77.9	72.8	7298	83.3
2010	6802.1	915	89.8	78.5	84.9	76.7	84.9	73.2	7967	90.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		172			475	
B. Refuelling without a maintenance	565			52	3	
C. Inspection, maintenance or repair combined with refuelling				1135	19	
E. Testing of plant systems or components				9	2	0
H. Nuclear regulatory requirements					0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					337	15
L. Human factor related					1	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			12		1	3
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		47				
Z. Others					2	
Subtotal	565	219	12	1196	840	18
Total		796			2054	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems		36
13. Reactor Auxiliary Systems		19
14. Safety Systems		37
15. Reactor Cooling Systems		9
16. Steam generation systems		74
21. Fuel Handling and Storage Facilities	22	5
31. Turbine and auxiliaries	15	50
32. Feedwater and Main Steam System	40	15
33. Circulating Water System		3
41. Main Generator Systems	24	155
42. Electrical Power Supply Systems		10
XX. Miscellaneous Systems	71	13
Total	172	437

FR-23 ST. LAURENT-B-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 880.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6694.8 GW(e).h
Energy Availability Factor: 83.6%
Load Factor: 83.5%
Operating Factor: 88.3%
Energy Unavailability Factor: 16.4%
Total Off-line Time: 1023 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	669.7	603.3	610.9	280.1	139.3	628.5	625.6	648.6	633.8	655.5	642.4	557.1	6694.8
EAF (%)	98.4	98.1	89.9	42.9	20.8	95.4	92.0	95.3	96.2	96.2	97.5	81.9	83.6
UCF (%)	99.8	99.9	99.9	53.5	21.2	99.7	97.3	99.9	99.9	99.0	99.8	82.8	87.6
LF (%)	98.4	98.1	89.9	42.5	20.5	95.4	91.9	95.3	96.2	96.2	97.5	81.8	83.5
OF (%)	100.0	100.0	100.0	53.6	27.3	100.0	97.8	100.0	100.0	99.3	100.0	82.9	88.3
EUf (%)	1.6	1.9	10.1	57.1	79.2	4.6	8.0	4.7	3.8	3.8	2.5	18.1	16.4
PUF (%)	0.2	0.1	0.1	46.5	67.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1	9.6
UCLF (%)	0.0	0.0	0.0	0.0	11.7	0.1	2.7	0.0	0.0	1.0	0.0	17.2	2.8
XUF (%)	1.4	1.8	10.0	10.7	0.4	4.3	5.3	4.6	3.7	2.8	2.3	0.9	4.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 07 Jan 1976 Lifetime Generation: 161055.0 GW(e).h
Date of First Criticality: 05 Dec 1981 Cumulative Energy Availability Factor: 77.0%
Date of Grid Connection: 06 Jan 1981 Cumulative Load Factor: 71.5%
Date of Commercial Operation: 08 Jan 1983 Cumulative Unit Capability Factor: 78.9%
Cumulative Energy Unavailability Factor: 23.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	512.0	880	16.1	16.1	16.1	16.1	15.8	15.8	615	16.7
1984	5724.0	880	88.9	67.4	88.9	67.4	74.0	56.9	7237	82.4
1985	5295.6	880	77.6	71.6	75.7	70.8	68.7	61.8	6806	77.7
1986	5662.8	880	81.7	74.6	79.8	73.4	73.5	65.2	7337	83.8
1987	5060.2	880	79.9	75.8	79.4	74.8	65.6	65.3	6798	77.6
1988	5108.0	880	69.6	74.6	69.6	73.8	66.1	65.4	6262	71.3
1989	5034.0	880	81.4	75.7	75.9	74.2	65.3	65.4	6490	74.1
1990	5165.9	915	73.8	75.4	71.3	73.8	64.4	65.3	6212	70.9
1991	6043.0	915	86.1	76.7	84.2	75.0	75.4	66.5	7374	84.2
1992	5490.1	915	80.6	77.1	79.4	75.5	68.3	66.7	6982	79.5
1993	5042.2	915	68.7	76.3	64.1	74.4	62.9	66.3	6149	70.2
1994	6322.7	915	83.7	77.0	81.2	75.0	78.9	67.5	7406	84.5
1995	5311.3	915	72.9	76.6	72.1	74.8	66.3	67.4	6720	76.7
1996	6057.7	915	82.2	77.1	80.8	75.2	75.4	68.0	7303	83.1
1997	5960.7	915	80.8	77.3	78.1	75.4	74.4	68.4	7147	81.6
1998	6415.3	915	85.7	77.9	83.2	75.9	80.0	69.2	7585	86.6
1999	5845.9	915	79.0	77.9	77.3	76.0	72.9	69.4	7013	80.1
2000	5134.0	915	67.6	77.3	67.0	75.5	63.9	69.1	6069	69.1
2001	6046.7	915	81.7	77.6	80.1	75.7	75.4	69.4	7226	82.5
2002	6215.0	890	82.2	77.8	82.2	76.1	79.7	70.0	7434	84.9
2003	4702.4	915	61.6	77.0	61.6	75.4	58.7	69.4	5580	63.7
2004	6468.6	915	87.6	77.5	85.6	75.8	80.5	69.9	7838	89.2
2005	5728.0	915	78.6	77.6	77.0	75.9	71.5	70.0	7038	80.3
2006	6004.3	915	89.8	78.1	88.3	76.4	74.9	70.2	7580	86.5
2007	5906.8	915	77.7	78.1	74.7	76.4	73.7	70.4	6949	79.3
2008	6581.4	915	88.0	78.5	86.1	76.7	81.9	70.8	7784	88.6
2009	6175.8	915	80.7	78.6	77.3	76.8	77.0	71.1	7086	80.9
2010	6694.8	915	87.6	78.9	83.6	77.0	83.5	71.5	7737	88.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		189			590	
B. Refuelling without a maintenance				21	7	
C. Inspection, maintenance or repair combined with refuelling	672			1037	14	
D. Inspection, maintenance or repair without refuelling				6		
E. Testing of plant systems or components	117			11	0	
H. Nuclear regulatory requirements					13	
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					129	0
L. Human factor related					7	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						2
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		48				
Z. Others					11	
Subtotal	789	237	0	1075	771	6
Total		1026			1852	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		13
12. Reactor I&C Systems	5	20
13. Reactor Auxiliary Systems		12
14. Safety Systems		53
15. Reactor Cooling Systems		47
16. Steam generation systems		36
21. Fuel Handling and Storage Facilities	12	4
31. Turbine and auxiliaries	150	220
32. Feedwater and Main Steam System		18
41. Main Generator Systems		67
42. Electrical Power Supply Systems		23
XX. Miscellaneous Systems	22	1
Total	189	514

FR-18 TRICASTIN-1

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 915.0 MW(e)
Design Discharge Burnup: 42000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6688.4 GW(e).h
Energy Availability Factor: 86.7%
Load Factor: 83.4%
Operating Factor: 88.5%
Energy Unavailability Factor: 13.3%
Total Off-line Time: 1005 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	656.8	568.0	554.0	615.8	633.6	612.3	42.9	445.0	619.5	656.5	614.4	669.6	6688.4
EAF (%)	100.0	95.7	86.9	98.9	99.4	95.8	6.4	67.6	97.1	98.0	96.2	100.0	86.7
UCF (%)	100.0	95.7	87.3	99.2	100.0	98.0	6.7	69.4	100.0	99.9	96.2	100.0	87.5
LF (%)	96.5	92.4	81.5	93.5	93.1	92.9	6.3	65.4	94.0	96.3	93.3	98.4	83.4
OF (%)	100.0	96.3	87.9	100.0	100.0	100.0	6.7	76.3	100.0	100.0	97.2	100.0	88.5
EUf (%)	0.0	4.3	13.1	1.1	0.6	4.2	93.6	32.4	2.9	2.0	3.8	0.0	13.3
PUF (%)	0.0	0.0	0.1	0.0	0.0	0.0	71.0	5.0	0.0	0.0	0.3	0.0	6.5
UCLF (%)	0.0	4.3	12.7	0.8	0.0	2.0	22.3	25.6	0.0	0.1	3.5	0.0	6.0
XUF (%)	0.0	0.0	0.4	0.3	0.6	2.3	0.3	1.8	2.9	1.9	0.0	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 11 Jan 1974
Date of First Criticality: 21/02/1980
Date of Grid Connection: 31/05/1980
Date of Commercial Operation: 12 Jan 1980

Lifetime Generation: 177529.7 GW(e).h
Cumulative Energy Availability Factor: 76.9%
Cumulative Load Factor: 72.9%
Cumulative Unit Capability Factor: 79.7%
Cumulative Energy Unavailability Factor: 23.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	656.0	918	56.6	56.6	56.6	56.6	95.8	95.8	722	97.0
1981	4416.0	920	56.3	56.4	56.3	56.4	54.8	58.0	5176	59.1
1982	5909.8	915	82.8	69.0	81.9	68.6	73.7	65.5	8151	93.0
1983	5111.0	915	67.2	68.4	67.2	68.1	63.8	65.0	6097	69.6
1984	6468.0	915	86.7	72.9	86.7	72.7	80.5	68.8	7662	87.2
1985	6217.9	915	86.0	75.5	81.6	74.4	77.6	70.5	7560	86.3
1986	5880.3	915	79.4	76.1	77.0	74.9	73.4	71.0	7188	82.1
1987	5978.1	915	83.5	77.1	78.2	75.3	74.6	71.5	7360	84.0
1988	5836.0	915	79.8	77.5	76.7	75.5	72.6	71.6	7200	82.0
1989	5830.2	915	83.3	78.1	83.2	76.3	72.7	71.7	7550	86.2
1990	5099.7	915	68.8	77.2	65.1	75.2	63.6	70.9	6377	72.8
1991	5909.1	915	83.2	77.7	77.0	75.4	73.7	71.2	7262	82.9
1992	5659.3	915	85.3	78.4	83.0	76.0	70.4	71.1	7573	86.2
1993	6134.8	915	83.9	78.8	77.7	76.1	76.5	71.5	7393	84.4
1994	5008.4	915	75.4	78.5	70.3	75.7	62.5	70.9	6458	73.7
1995	5372.7	915	71.3	78.1	70.6	75.4	67.0	70.6	6374	72.8
1996	7302.1	915	94.5	79.1	93.8	76.5	90.9	71.9	8448	96.2
1997	5548.3	915	73.1	78.7	72.5	76.3	69.2	71.7	6711	76.6
1998	5503.7	915	71.0	78.3	71.0	76.0	68.7	71.6	7075	80.8
1999	3426.7	915	44.9	76.6	44.5	74.4	42.8	70.1	4016	45.8
2000	6644.9	915	87.7	77.1	87.1	75.0	82.7	70.7	7842	89.3
2001	6053.3	915	83.2	77.4	82.0	75.3	75.5	70.9	7261	82.9
2002	6384.6	880	87.2	77.8	86.1	75.8	82.8	71.4	7778	88.8
2003	5670.1	915	85.2	78.1	73.0	75.7	70.7	71.4	7029	80.2
2004	6832.5	915	91.5	78.7	89.0	76.2	85.0	72.0	8049	91.6
2005	5831.0	915	85.3	79.0	74.0	76.1	72.7	72.0	7007	80.0
2006	6466.8	915	90.7	79.4	87.4	76.6	80.7	72.3	7989	91.2
2007	6344.7	915	84.8	79.6	82.6	76.8	79.2	72.6	7496	85.6
2008	6808.2	915	89.7	80.0	87.9	77.2	84.7	73.0	7950	90.5
2009	4655.4	915	63.5	79.4	59.2	76.6	58.1	72.5	5435	62.0
2010	6688.4	915	87.5	79.7	86.7	76.9	83.4	72.9	7755	88.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		116			341	1
B. Refuelling without a maintenance	528			19	5	
C. Inspection, maintenance or repair combined with refuelling				1045	9	
D. Inspection, maintenance or repair without refuelling				19	2	
E. Testing of plant systems or components				4	0	
H. Nuclear regulatory requirements					1	2
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					28	0
L. Human factor related		20			5	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						8
Z. Others		342			16	
Subtotal	528	478	0	1087	407	13
Total		1006			1507	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		85
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		2
14. Safety Systems		3
15. Reactor Cooling Systems		25
16. Steam generation systems		35
21. Fuel Handling and Storage Facilities		17
31. Turbine and auxiliaries	116	31
32. Feedwater and Main Steam System		10
33. Circulating Water System		0
35. All other I&C Systems		0
41. Main Generator Systems		80
42. Electrical Power Supply Systems		23
Total	116	316

FR-19 TRICASTIN-2

Operator: EDF (ELECTRICITE DE FRANCE)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
Design Net Capacity: 915.0 MW(e)
Design Discharge Burnup: 33735 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6467.5 GW(e).h
Energy Availability Factor: 84.8%
Load Factor: 80.7%
Operating Factor: 87.1%
Energy Unavailability Factor: 15.2%
Total Off-line Time: 1131 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	642.5	557.1	608.3	628.0	590.9	558.4	492.7	0.0	525.2	600.9	642.6	621.0	6467.5
EAF (%)	96.1	99.6	99.6	99.9	93.7	93.7	74.9	0.0	82.9	90.3	98.7	91.2	84.8
UCF (%)	96.1	99.6	100.0	99.9	99.5	99.9	77.5	0.0	84.5	91.3	100.0	100.0	87.2
LF (%)	94.4	90.6	89.5	95.3	86.8	84.8	72.4	0.0	79.7	88.2	97.5	91.2	80.7
OF (%)	100.0	100.0	100.0	100.0	95.2	96.0	77.6	0.0	87.2	91.5	100.0	100.0	87.1
EUf (%)	3.9	0.4	0.4	0.1	6.3	6.3	25.1	100.0	17.1	9.7	1.3	8.8	15.2
PUF (%)	3.9	0.0	0.0	0.1	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4
UCLF (%)	0.0	0.4	0.0	0.1	0.1	0.1	22.5	100.0	15.5	8.7	0.0	0.0	12.5
XUF (%)	0.0	0.0	0.4	0.0	5.7	6.2	2.6	0.0	1.6	0.9	1.3	8.8	2.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 12 Jan 1974
Date of First Criticality: 22/07/1980
Date of Grid Connection: 08 Jul 1980
Date of Commercial Operation: 12 Jan 1980
Lifetime Generation: 175776.8 GW(e).h
Cumulative Energy Availability Factor: 76.7%
Cumulative Load Factor: 72.5%
Cumulative Unit Capability Factor: 79.3%
Cumulative Energy Unavailability Factor: 23.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	466.0	917	68.7	68.7	68.7	68.7	68.1	68.1	568	76.3
1981	6155.1	920	82.3	81.3	82.3	81.3	76.4	75.7	7819	89.3
1982	4056.2	915	63.0	72.5	63.0	72.5	50.6	63.7	5932	67.7
1983	5624.0	915	81.9	75.6	81.9	75.6	70.2	65.8	7245	82.7
1984	6603.0	915	87.2	78.4	87.2	78.4	82.2	69.8	7684	87.5
1985	6261.7	915	86.0	79.9	79.4	78.6	78.1	71.4	7375	84.2
1986	6286.6	915	85.8	80.9	82.6	79.3	78.4	72.6	7631	87.1
1987	5302.3	915	73.2	79.8	69.6	77.9	66.2	71.7	6500	74.2
1988	4896.0	915	76.0	79.3	73.1	77.3	60.9	70.3	6628	75.5
1989	5164.7	915	74.3	78.8	71.4	76.7	64.4	69.7	6650	75.9
1990	5614.4	915	80.9	79.0	72.5	76.2	70.0	69.7	7177	81.9
1991	4459.1	915	60.8	77.3	58.2	74.6	55.6	68.5	5429	62.0
1992	6099.1	915	80.0	77.6	78.7	75.0	75.9	69.1	7118	81.0
1993	5777.1	915	77.3	77.5	72.9	74.8	72.1	69.3	6876	78.5
1994	6216.7	915	81.7	77.8	79.1	75.1	77.6	69.9	7222	82.4
1995	6312.3	915	84.6	78.3	81.6	75.5	78.8	70.5	7504	85.7
1996	6391.3	915	84.9	78.7	82.1	75.9	79.5	71.0	7615	86.7
1997	5218.8	915	68.5	78.1	66.8	75.4	65.1	70.7	6107	69.7
1998	6293.9	915	83.0	78.4	81.2	75.7	78.5	71.1	7354	83.9
1999	5661.5	915	75.0	78.2	73.0	75.6	70.6	71.1	6674	76.2
2000	4293.8	915	56.7	77.1	55.3	74.6	53.4	70.2	5092	58.0
2001	6710.5	915	87.2	77.6	87.1	75.2	83.7	70.9	7779	88.8
2002	6593.9	880	86.6	78.0	86.3	75.7	85.5	71.5	7714	88.1
2003	6196.0	915	88.4	78.4	84.4	76.0	77.3	71.7	7521	85.9
2004	5684.2	915	86.4	78.8	80.7	76.2	70.7	71.7	7271	82.8
2005	5878.7	915	82.6	78.9	77.8	76.3	73.3	71.8	7128	81.4
2006	6221.3	915	83.0	79.1	80.7	76.5	77.6	72.0	7366	84.1
2007	6910.1	915	90.4	79.5	89.3	76.9	86.2	72.5	7989	91.2
2008	4884.4	915	65.1	79.0	63.6	76.5	60.8	72.1	5768	65.7
2009	6083.6	915	79.6	79.0	76.1	76.4	75.9	72.2	7028	80.2
2010	6467.5	915	87.2	79.3	84.8	76.7	80.7	72.5	7629	87.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1066			375	
B. Refuelling without a maintenance				17	3	
C. Inspection, maintenance or repair combined with refuelling				1010	33	
D. Inspection, maintenance or repair without refuelling				33		
E. Testing of plant systems or components				4	1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					31	39
L. Human factor related					25	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)			79			
Z. Others					5	
Subtotal	0	1066	79	1064	473	45
Total		1145			1582	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		65
12. Reactor I&C Systems		38
13. Reactor Auxiliary Systems		7
14. Safety Systems		20
15. Reactor Cooling Systems		40
16. Steam generation systems		9
21. Fuel Handling and Storage Facilities		23
31. Turbine and auxiliaries		45
32. Feedwater and Main Steam System		7
41. Main Generator Systems	63	36
42. Electrical Power Supply Systems	1003	9
XX. Miscellaneous Systems		1
Total	1066	300

FR-25 TRICASTIN-3

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 915.0 MW(e)
 Design Net Capacity: 915.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6257.5 GW(e).h
 Energy Availability Factor: 79.1%
 Load Factor: 78.1%
 Operating Factor: 80.9%
 Energy Unavailability Factor: 20.9%
 Total Off-line Time: 1671 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	663.5	603.8	650.5	638.1	20.1	0.0	409.3	645.8	621.2	663.5	655.5	686.3	6257.5
EAF (%)	98.5	99.1	95.8	97.3	3.0	0.0	61.2	98.1	99.2	98.3	100.0	100.0	79.1
UCF (%)	98.5	99.1	95.8	100.0	3.3	4.4	62.0	99.2	100.0	99.9	100.0	100.0	80.1
LF (%)	97.5	98.2	95.7	96.9	3.0	0.0	60.1	94.9	94.3	97.3	99.5	100.8	78.1
OF (%)	100.0	100.0	100.0	100.0	3.4	0.0	68.8	100.0	100.0	100.0	100.0	100.0	80.9
EUf (%)	1.5	0.9	4.2	2.7	97.0	100.0	38.8	1.9	0.8	1.7	0.0	0.0	20.9
PUF (%)	0.3	0.0	0.0	0.0	96.7	63.6	6.8	0.0	0.0	0.1	0.0	0.0	14.1
UCLF (%)	1.2	0.9	4.2	0.0	0.0	31.9	31.2	0.8	0.0	0.0	0.0	0.0	5.9
XUF (%)	0.0	0.0	0.0	2.7	0.3	4.4	0.7	1.1	0.8	1.7	0.0	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 04 Jan 1975 Lifetime Generation: 180347.6 GW(e).h
 Date of First Criticality: 29/11/1980 Cumulative Energy Availability Factor: 78.8%
 Date of Grid Connection: 02 Oct 1981 Cumulative Load Factor: 75.5%
 Date of Commercial Operation: 05 Nov 1981 Cumulative Unit Capability Factor: 81.1%
 Cumulative Energy Unavailability Factor: 21.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	3998.5	919	78.0	78.0	78.0	78.0	73.9	73.9	4815	81.9
1982	5067.3	915	65.8	70.7	65.8	70.7	63.2	67.5	5966	68.1
1983	6342.0	915	82.8	75.2	82.8	75.2	79.1	71.9	7544	86.1
1984	6682.0	915	85.1	77.9	85.1	77.9	83.1	74.9	7668	87.3
1985	7166.0	915	97.1	82.0	94.3	81.4	89.4	78.0	8518	97.2
1986	6230.4	915	86.8	82.9	83.5	81.8	77.7	78.0	7704	87.9
1987	5654.3	915	76.9	82.0	75.4	80.8	70.5	76.9	6810	77.7
1988	5722.0	915	80.3	81.7	78.0	80.5	71.2	76.1	7106	80.9
1989	5834.6	915	80.9	81.7	75.9	79.9	72.8	75.7	7188	82.1
1990	6457.2	915	85.8	82.1	84.6	80.4	80.6	76.2	7671	87.6
1991	4746.8	915	66.5	80.6	62.1	78.7	59.2	74.6	5941	67.8
1992	5199.0	915	67.5	79.5	66.6	77.7	64.7	73.8	6010	68.4
1993	6423.9	915	83.3	79.8	81.4	78.0	80.1	74.3	7373	84.2
1994	6496.5	915	86.3	80.3	83.6	78.4	81.1	74.8	7641	87.2
1995	6494.7	915	87.0	80.7	85.1	78.8	81.0	75.2	7675	87.6
1996	5806.7	915	79.3	80.6	76.2	78.7	72.2	75.0	7172	81.6
1997	6192.8	915	82.6	80.7	79.1	78.7	77.3	75.2	7331	83.7
1998	6359.5	915	82.3	80.8	80.5	78.8	79.3	75.4	7375	84.2
1999	5731.7	915	76.7	80.6	74.0	78.5	71.5	75.2	6828	77.9
2000	5985.2	915	82.3	80.7	79.0	78.6	74.5	75.1	7325	83.4
2001	4929.5	915	65.8	80.0	65.2	77.9	61.5	74.5	5777	65.9
2002	5976.1	880	79.7	80.0	79.4	78.0	77.5	74.6	7140	81.5
2003	6144.9	915	86.9	80.3	79.7	78.0	76.7	74.7	7607	86.8
2004	6377.1	915	84.3	80.4	82.9	78.3	79.3	74.9	7455	84.9
2005	6563.0	915	90.4	80.8	86.1	78.6	81.9	75.2	7981	91.1
2006	6006.9	915	86.5	81.1	81.3	78.7	74.9	75.2	7488	85.5
2007	6775.0	915	89.0	81.4	87.6	79.0	84.5	75.5	7862	89.7
2008	6185.2	915	79.7	81.3	78.6	79.0	77.0	75.6	7030	80.0
2009	5750.6	915	75.9	81.1	73.6	78.8	71.7	75.4	6608	75.4
2010	6257.5	915	80.1	81.1	79.1	78.8	78.1	75.5	7089	80.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		101			334	
B. Refuelling without a maintenance				17	11	
C. Inspection, maintenance or repair combined with refuelling	1177			999	9	
D. Inspection, maintenance or repair without refuelling				31		
E. Testing of plant systems or components	0			5	1	
H. Nuclear regulatory requirements					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	0
L. Human factor related					16	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						4
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			32		7	0
Z. Others		361			10	
Subtotal	1177	462	32	1052	413	4
Total		1671			1469	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		15
12. Reactor I&C Systems		39
13. Reactor Auxiliary Systems		13
14. Safety Systems		20
15. Reactor Cooling Systems		44
16. Steam generation systems		3
21. Fuel Handling and Storage Facilities	61	1
31. Turbine and auxiliaries		51
32. Feedwater and Main Steam System		7
33. Circulating Water System		2
35. All other I&C Systems	40	
41. Main Generator Systems		117
42. Electrical Power Supply Systems		2
XX. Miscellaneous Systems		2
Total	101	316

FR-26 TRICASTIN-4

Operator: EDF (ELECTRICITE DE FRANCE)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 915.0 MW(e)
 Design Net Capacity: 915.0 MW(e)
 Design Discharge Burnup: 33735 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6263.8 GW(e).h
 Energy Availability Factor: 80.0%
 Load Factor: 78.1%
 Operating Factor: 83.0%
 Energy Unavailability Factor: 20.0%
 Total Off-line Time: 1485 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	660.2	587.5	659.0	625.0	663.2	640.1	615.7	353.9	0.0	144.7	631.2	683.3	6263.8
EAF (%)	99.9	100.0	100.0	99.8	99.8	98.4	92.1	53.6	0.0	21.2	96.0	100.0	80.0
UCF (%)	99.9	100.0	100.0	99.9	100.0	100.0	100.0	64.6	0.0	27.7	96.0	100.0	82.3
LF (%)	97.0	95.5	96.9	94.9	97.4	97.2	90.4	52.0	0.0	21.2	95.8	100.4	78.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	64.8	0.0	32.5	100.0	100.0	83.0
EUf (%)	0.1	0.0	0.0	0.2	0.2	1.6	7.9	46.4	100.0	78.8	4.0	0.0	20.0
PUF (%)	0.1	0.0	0.0	0.1	0.0	0.0	0.0	35.4	100.0	31.0	4.0	0.0	14.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.3	0.0	0.0	3.5
XUF (%)	0.0	0.0	0.0	0.1	0.2	1.6	7.9	11.0	0.0	6.4	0.0	0.0	2.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

LOAD FOLLOWING

5. Historical Summary

Date of Construction Start: 05 Jan 1975 Lifetime Generation: 174515.6 GW(e).h
 Date of First Criticality: 31/05/1981 Cumulative Energy Availability Factor: 79.4%
 Date of Grid Connection: 06 Dec 1981 Cumulative Load Factor: 74.2%
 Date of Commercial Operation: 11 Jan 1981 Cumulative Unit Capability Factor: 82.1%
 Cumulative Energy Unavailability Factor: 20.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	1283.6	917	97.2	97.2	97.2	97.2	95.3	95.3	1462	99.9
1982	5470.5	915	69.8	73.8	69.8	73.8	68.2	72.1	6311	72.0
1983	6170.0	915	80.7	77.0	80.7	77.0	77.0	74.4	7386	84.3
1984	5446.0	915	87.1	80.2	87.1	80.2	67.8	72.3	7587	86.4
1985	6161.7	915	91.3	82.8	84.8	81.3	76.9	73.4	7816	89.2
1986	5873.9	915	85.7	83.4	81.8	81.4	73.3	73.4	7568	86.4
1987	5725.7	915	84.2	83.5	80.1	81.2	71.4	73.0	7257	82.8
1988	3770.0	915	67.7	81.3	66.2	79.1	46.9	69.4	4772	54.3
1989	5729.1	915	82.9	81.5	79.8	79.2	71.5	69.7	7335	83.7
1990	5201.6	915	82.7	81.6	77.4	79.0	64.9	69.1	7329	83.7
1991	5742.8	915	77.1	81.2	74.5	78.5	71.6	69.4	6838	78.1
1992	6459.3	915	90.2	82.0	86.7	79.3	80.4	70.4	7968	90.7
1993	5302.8	915	80.1	81.8	70.9	78.6	66.2	70.0	6842	78.1
1994	5953.0	915	80.9	81.8	77.8	78.5	74.3	70.3	7049	80.5
1995	6208.9	915	85.7	82.0	82.0	78.8	77.5	70.8	7562	86.3
1996	6700.4	915	87.6	82.4	86.5	79.3	83.4	71.7	7774	88.5
1997	6488.8	915	86.0	82.6	84.8	79.6	81.0	72.2	7595	86.7
1998	5913.0	915	80.4	82.5	76.2	79.4	73.8	72.3	7138	81.5
1999	5887.9	915	80.5	82.4	78.0	79.3	73.5	72.4	7158	81.7
2000	5780.3	915	77.4	82.1	75.8	79.2	71.9	72.4	6873	78.2
2001	6036.9	915	83.0	82.2	81.2	79.3	75.3	72.5	7138	81.5
2002	6260.6	880	83.3	82.2	81.2	79.4	81.2	72.9	7168	81.8
2003	6387.9	915	82.9	82.3	79.9	79.4	79.7	73.2	7399	84.5
2004	4724.1	915	59.8	81.3	58.8	78.5	58.8	72.6	5359	61.0
2005	6501.4	915	88.8	81.6	83.6	78.7	81.1	72.9	7728	88.2
2006	6410.4	915	84.1	81.7	83.0	78.9	80.0	73.2	7412	84.6
2007	7047.0	915	92.2	82.1	90.4	79.3	87.9	73.8	8096	92.4
2008	6016.6	915	77.4	81.9	76.4	79.2	74.9	73.8	6867	78.2
2009	6536.7	915	86.5	82.1	84.8	79.4	81.6	74.1	7630	87.1
2010	6263.8	915	82.3	82.1	80.0	79.4	78.1	74.2	7275	83.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					235	0
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1152			1037	10	
D. Inspection, maintenance or repair without refuelling				20		
E. Testing of plant systems or components				0		
H. Nuclear regulatory requirements					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					75	10
L. Human factor related					25	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)			48			
Z. Others		285			12	0
Subtotal	1152	285	48	1057	358	11
Total		1485			1426	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		26
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		11
14. Safety Systems		36
15. Reactor Cooling Systems		20
16. Steam generation systems		29
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		7
41. Main Generator Systems		40
42. Electrical Power Supply Systems		11
XX. Miscellaneous Systems		1
Total	0	213

DE-12 BIBLIS-A (KWB A)

Operator: RWE (RWE Power AG)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1167.0 MW(e)
 Design Net Capacity: 1146.0 MW(e)
 Design Discharge Burnup: 33500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4674.7 GW(e).h
 Energy Availability Factor: 63.3%
 Load Factor: 45.7%
 Operating Factor: 69.6%
 Energy Unavailability Factor: 36.7%
 Total Off-line Time: 2667 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	203.0	302.7	313.1	370.3	710.8	601.4	200.9	268.4	835.6	868.5	4674.7
EAF (%)	0.0	0.0	33.6	99.4	100.0	99.9	98.7	69.4	23.5	31.0	99.9	100.0	63.3
UCF (%)	0.0	0.0	33.6	99.4	100.0	99.9	100.0	80.5	23.5	31.0	100.0	100.0	64.3
LF (%)	0.0	0.0	23.4	36.0	36.1	44.1	81.9	69.3	23.9	30.9	99.5	100.0	45.7
OF (%)	0.0	0.0	39.2	99.4	100.0	100.0	100.0	100.0	56.4	35.4	100.0	100.0	69.6
EUf (%)	100.0	100.0	66.4	0.6	0.0	0.1	1.3	30.6	76.5	69.0	0.1	0.0	36.7
PUF (%)	100.0	100.0	66.4	0.0	0.0	0.1	0.0	0.0	43.7	67.1	0.0	0.0	31.1
UCLF (%)	0.0	0.0	0.0	0.6	0.0	0.0	0.0	19.5	32.8	2.0	0.0	0.0	4.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.3	11.0	0.0	0.0	0.1	0.0	1.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION ON REDUCED POWER FOR OPTIMIZATION OF CONDITIONING MODE IN THE CONTEXT OF RESOURCE SCHEDULING OF NUCLEAR POWER PLANT2010-07-03: TWO-UNIT PLANT BIBLIS GENERATED 500000 GWE.H

5. Historical Summary

Date of Construction Start: 01 Jan 1970
 Date of First Criticality: 16/07/1974
 Date of Grid Connection: 25/08/1974
 Date of Commercial Operation: 26/02/1975
 Lifetime Generation: 230673.7 GW(e).h
 Cumulative Energy Availability Factor: 67.8%
 Cumulative Load Factor: 63.5%
 Cumulative Unit Capability Factor: 68.3%
 Cumulative Energy Unavailability Factor: 32.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1975	7571.9	1146	82.4	82.4	82.4	82.4	82.4	82.4	82.4	6886	85.9
1976	5102.8	1146	60.2	70.8	52.7	66.9	50.7	65.8	4617	52.6	
1977	6164.5	1089	65.4	69.0	65.4	66.4	64.6	65.4	5970	68.2	
1978	7067.1	1089	70.0	69.3	70.0	67.3	74.1	67.6	6524	74.5	
1979	6569.0	1089	87.4	72.9	87.4	71.3	68.9	67.8	7507	85.7	
1980	3855.0	1146	42.5	67.6	42.5	66.3	38.3	62.7	4119	46.9	
1981	6844.3	1146	69.6	67.9	69.6	66.8	68.2	63.5	6288	71.8	
1982	8994.3	1146	86.6	70.3	86.6	69.3	89.6	66.9	7723	88.2	
1983	7766.0	1146	75.8	70.9	75.8	70.1	77.4	68.1	6783	77.4	
1984	6901.0	1146	67.9	70.6	67.9	69.8	68.6	68.1	6175	70.3	
1985	7564.9	1146	79.2	71.4	75.1	70.3	75.4	68.8	6797	77.6	
1986	6968.1	1146	76.9	71.9	76.9	70.9	69.4	68.8	7227	82.5	
1987	7467.8	1146	80.9	72.6	80.9	71.7	74.4	69.3	7154	81.7	
1988	5985.4	1146	72.5	72.6	72.5	71.7	59.5	68.6	6594	75.1	
1989	6431.0	1146	66.9	72.2	66.9	71.4	64.1	68.3	5904	67.4	
1990	5052.7	1146	53.1	71.0	53.1	70.2	50.3	67.1	4676	53.4	
1991	6931.0	1146	76.3	71.3	76.3	70.6	69.0	67.2	6778	77.4	
1992	6884.8	1146	79.6	71.8	79.6	71.1	68.4	67.3	7024	80.0	
1993	8240.7	1146	97.5	73.1	97.5	72.5	82.1	68.1	8558	97.7	
1994	7483.6	1146	76.8	73.3	76.8	72.7	74.5	68.4	6697	76.4	
1995	2509.4	1156	30.0	71.2	30.0	70.7	24.8	66.3	2655	30.3	
1996	4012.5	1167	39.7	69.7	39.7	69.2	39.1	65.0	3503	39.9	
1997	8002.3	1167	87.0	70.5	87.0	70.0	78.3	65.6	7648	87.3	
1998	10042.3	1167	99.7	71.8	99.7	71.3	98.2	67.0	8752	99.9	
1999	7251.1	1167	78.0	72.0	78.0	71.5	70.9	67.2	6865	78.4	
2000	5910.1	1167	62.5	71.6	62.5	71.2	57.7	66.8	5497	62.6	
2001	9532.0	1167	94.9	72.5	94.9	72.1	93.2	67.8	8334	95.1	
2002	6167.7	1167	68.1	72.3	68.1	71.9	60.3	67.5	5988	68.4	
2003	2695.8	1167	26.6	70.7	26.6	70.3	26.4	66.1	2406	27.5	
2004	9645.5	1167	95.2	71.6	95.2	71.2	94.1	67.0	8395	95.6	
2005	7355.9	1167	73.4	71.6	72.7	71.2	71.9	67.2	6489	74.1	
2006	6994.5	1167	70.6	71.6	69.3	71.2	68.4	67.2	6190	70.7	
2007	0.0	1167	0.0	69.4	0.0	69.0	0.0	65.2	0	0.0	
2008	8472.8	1167	88.4	70.0	85.2	69.5	82.7	65.7	7783	88.6	
2009	1013.0	1167	15.8	68.4	15.8	67.9	9.9	64.1	1393	15.9	
2010	4674.7	1167	64.3	68.3	63.3	67.8	45.7	63.5	6093	69.6	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		4			723	
B. Refuelling without a maintenance	795			7	2	
C. Inspection, maintenance or repair combined with refuelling				1295	2	
D. Inspection, maintenance or repair without refuelling	1			303		
E. Testing of plant systems or components				25	6	
F. Major back-fitting, refurbishment or upgrading activities with refuelling	1867			204		
H. Nuclear regulatory requirements					11	18
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	3	0
Subtotal	2663	4	0	1836	747	18
Total		2667			2601	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		10
12. Reactor I&C Systems		19
13. Reactor Auxiliary Systems		3
14. Safety Systems		355
15. Reactor Cooling Systems		177
16. Steam generation systems		69
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		6
31. Turbine and auxiliaries	4	27
32. Feedwater and Main Steam System		19
33. Circulating Water System		2
41. Main Generator Systems		27
42. Electrical Power Supply Systems		1
Total	4	716

DE-18 BIBLIS-B (KWB B)

Operator: RWE (RWE Power AG)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1240.0 MW(e)
 Design Net Capacity: 1178.0 MW(e)
 Design Discharge Burnup: 31500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9737.5 GW(e).h
 Energy Availability Factor: 90.4%
 Load Factor: 89.6%
 Operating Factor: 92.9%
 Energy Unavailability Factor: 9.6%
 Total Off-line Time: 622 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	860.3	797.2	907.0	879.7	899.0	861.2	860.6	887.5	867.7	903.9	312.7	700.6	9737.5
EAF (%)	93.9	96.2	99.9	99.4	98.2	97.1	95.1	96.9	97.9	98.6	35.3	76.1	90.4
UCF (%)	94.0	96.2	100.0	100.0	99.9	99.3	99.9	100.0	100.0	99.8	35.5	76.1	91.8
LF (%)	93.3	95.7	98.4	98.5	97.5	96.5	93.3	96.2	97.2	97.8	35.0	75.9	89.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	36.5	77.8	92.9
EUf (%)	6.1	3.8	0.1	0.6	1.8	2.9	4.9	3.1	2.1	1.4	64.7	23.9	9.6
PUF (%)	0.0	3.7	0.0	0.0	0.1	0.7	0.1	0.0	0.0	0.2	64.5	23.5	7.7
UCLF (%)	6.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5
XUF (%)	0.1	0.0	0.1	0.6	1.8	2.2	4.8	3.1	2.1	1.1	0.2	0.0	1.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

2010-07-03: TWO-UNIT PLANT BIBLIS GENERATED 500000 GWE.H

5. Historical Summary

Date of Construction Start: 02 Jan 1972
 Date of First Criticality: 25/03/1976
 Date of Grid Connection: 25/04/1976
 Date of Commercial Operation: 31/01/1977
 Lifetime Generation: 245709.8 GW(e).h
 Cumulative Energy Availability Factor: 72.8%
 Cumulative Load Factor: 66.7%
 Cumulative Unit Capability Factor: 73.2%
 Cumulative Energy Unavailability Factor: 27.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	8017.2	1178	78.8	78.8	78.8	78.8	77.7	77.7	7490	85.5
1978	5658.0	1178	55.3	67.1	55.3	67.1	54.8	66.3	6015	68.7
1979	6026.0	1178	77.9	70.7	77.9	70.7	58.4	63.6	7254	82.8
1980	5592.0	1240	57.8	67.3	57.8	67.3	51.3	60.4	5761	65.6
1981	8105.6	1240	75.4	69.0	75.4	69.0	74.6	63.4	6804	77.7
1982	9196.0	1240	85.5	71.8	85.5	71.8	84.7	67.0	7681	87.7
1983	6490.0	1240	60.6	70.2	60.6	70.2	59.7	65.9	5360	61.2
1984	8216.0	1240	77.6	71.1	77.6	71.1	75.4	67.2	7338	83.5
1985	7780.2	1240	75.3	71.6	75.3	71.6	71.6	67.7	6918	79.0
1986	6722.6	1240	68.2	71.2	68.2	71.2	61.9	67.1	6370	72.7
1987	5623.0	1240	76.2	71.7	76.2	71.7	51.8	65.7	7273	83.0
1988	5591.8	1240	74.8	72.0	74.8	72.0	51.3	64.5	6593	75.1
1989	5165.8	1240	53.6	70.5	53.6	70.5	47.6	63.1	4807	54.9
1990	9100.1	1240	90.1	71.9	90.1	71.9	83.8	64.6	8631	98.5
1991	3917.8	1240	41.1	69.9	39.3	69.7	36.1	62.7	3626	41.4
1992	7630.5	1240	81.5	70.6	81.5	70.5	70.1	63.2	7184	81.8
1993	7441.8	1240	83.8	71.4	83.8	71.3	68.5	63.5	7368	84.1
1994	7973.8	1240	84.9	72.1	84.9	72.0	73.4	64.0	7468	85.3
1995	7854.2	1240	75.4	72.3	75.4	72.2	72.3	64.5	6603	75.4
1996	7857.4	1240	80.1	72.7	80.1	72.6	72.1	64.9	6762	77.0
1997	8469.4	1240	85.9	73.3	85.9	73.3	78.0	65.5	7560	86.3
1998	8182.1	1240	84.4	73.8	84.4	73.8	75.3	65.9	7409	84.6
1999	8707.4	1240	85.0	74.3	85.0	74.2	80.2	66.6	7474	85.3
2000	8295.7	1240	89.2	75.0	89.2	74.9	76.2	67.0	7950	90.5
2001	7442.2	1240	73.8	74.9	73.8	74.8	68.5	67.0	6470	73.9
2002	10173.6	1240	95.2	75.7	95.2	75.6	93.7	68.1	8371	95.6
2003	7792.0	1240	75.3	75.7	75.3	75.6	71.7	68.2	6630	75.7
2004	8768.4	1240	82.7	75.9	82.5	75.9	80.5	68.6	7309	83.2
2005	6892.5	1240	67.8	75.7	64.0	75.4	63.5	68.5	6014	68.7
2006	8312.1	1240	78.9	75.8	77.9	75.5	76.5	68.7	6929	79.1
2007	885.2	1240	8.2	73.6	8.2	73.3	8.1	66.8	731	8.3
2008	10368.0	1240	99.7	74.4	96.1	74.1	95.2	67.7	8766	99.8
2009	1511.3	1240	16.8	72.6	14.1	72.2	13.9	66.0	1513	17.3
2010	9737.5	1240	91.8	73.2	90.4	72.8	89.6	66.7	8138	92.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					440	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				1170		
D. Inspection, maintenance or repair without refuelling	622			42		
E. Testing of plant systems or components				2	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				426		
H. Nuclear regulatory requirements				14	33	
J. Grid limitation, failure or grid unavailability						0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Subtotal	622	0	0	1654	473	0
Total		622			2127	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		26
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		62
15. Reactor Cooling Systems		152
16. Steam generation systems		133
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		15
32. Feedwater and Main Steam System		21
33. Circulating Water System		1
41. Main Generator Systems		24
Total	0	437

DE-32 BROKDORF (KBR)

Operator: E.ON (E.ON Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1410.0 MW(e)
 Design Net Capacity: 1307.0 MW(e)
 Design Discharge Burnup: 34000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11360.4 GW(e).h
 Energy Availability Factor: 93.3%
 Load Factor: 92.0%
 Operating Factor: 93.6%
 Energy Unavailability Factor: 6.7%
 Total Off-line Time: 559 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1047.4	938.5	1039.1	1000.6	469.5	782.3	991.7	1018.4	982.8	1040.1	1007.4	1042.7	11360.4
EAF (%)	100.0	100.0	100.0	100.0	45.5	78.2	98.0	100.0	99.2	99.8	99.9	99.8	93.3
UCF (%)	100.0	100.0	100.0	100.0	45.5	78.2	99.5	100.0	99.2	99.8	100.0	99.8	93.4
LF (%)	99.8	99.1	99.2	98.6	44.8	77.1	94.5	97.1	96.8	99.0	99.2	99.4	92.0
OF (%)	100.0	100.0	100.0	100.0	46.0	78.9	100.0	100.0	99.3	100.0	100.0	100.0	93.6
EUf (%)	0.0	0.0	0.0	0.0	54.5	21.8	2.0	0.0	0.8	0.2	0.1	0.2	6.7
PUf (%)	0.0	0.0	0.0	0.0	53.1	0.0	0.0	0.0	0.8	0.1	0.1	0.2	4.6
UCLF (%)	0.0	0.0	0.0	0.0	1.4	21.8	0.5	0.0	0.0	0.1	0.0	0.0	2.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 01 Jan 1976
 Date of First Criticality: 10 Aug 1986
 Date of Grid Connection: 14/10/1986
 Date of Commercial Operation: 22/12/1986
 Lifetime Generation: 254299.2 GW(e).h
 Cumulative Energy Availability Factor: 90.7%
 Cumulative Load Factor: 88.6%
 Cumulative Unit Capability Factor: 90.9%
 Cumulative Energy Unavailability Factor: 9.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	296.8	1307	100.0	100.0	100.0	100.0	30.5	30.5	228	30.6
1987	9481.3	1307	85.2	86.3	85.2	86.3	82.8	78.7	7477	85.4
1988	8581.8	1326	85.2	85.8	85.2	85.8	73.7	76.3	7014	79.8
1989	8991.3	1326	80.0	83.9	80.0	83.9	77.4	76.6	7134	81.4
1990	8337.2	1326	72.5	81.1	72.5	81.1	71.8	75.4	6447	73.6
1991	9492.7	1326	85.7	82.0	85.7	82.0	81.7	76.7	7542	86.1
1992	10788.0	1326	96.0	84.3	96.0	84.3	92.6	79.3	8461	96.3
1993	9447.1	1326	85.6	84.5	84.8	84.4	81.3	79.6	7441	84.9
1994	10228.6	1326	88.7	85.0	88.7	84.9	88.1	80.6	7793	89.0
1995	9912.4	1326	86.6	85.2	86.6	85.1	85.3	81.2	7833	89.4
1996	10555.4	1326	93.2	86.0	93.2	85.9	90.6	82.1	8212	93.5
1997	11249.3	1326	95.1	86.8	95.1	86.7	96.8	83.4	8328	95.1
1998	10752.3	1326	92.6	87.3	90.4	87.0	92.6	84.2	7966	90.9
1999	11093.3	1370	93.3	87.8	93.3	87.5	92.4	84.8	8177	93.3
2000	11335.1	1370	95.6	88.3	95.6	88.1	94.2	85.5	8397	95.6
2001	11215.4	1370	95.0	88.8	95.0	88.6	93.5	86.1	8331	95.1
2002	11336.9	1370	95.8	89.2	95.8	89.0	94.5	86.6	8405	95.9
2003	10564.6	1370	90.1	89.3	90.1	89.1	88.0	86.7	7903	90.2
2004	11040.8	1370	94.7	89.6	94.7	89.4	91.7	87.0	8327	94.8
2005	11400.7	1370	96.1	89.9	95.9	89.8	95.0	87.4	8433	96.3
2006	11201.3	1370	94.7	90.2	93.7	90.0	93.3	87.7	8307	94.8
2007	11425.6	1370	94.5	90.4	94.3	90.2	95.2	88.1	8293	94.7
2008	11450.4	1410	94.6	90.6	94.1	90.4	92.5	88.3	8320	94.7
2009	11459.4	1410	94.1	90.7	94.1	90.5	92.8	88.5	8260	94.3
2010	11360.4	1410	93.4	90.9	93.3	90.7	92.0	88.6	8201	93.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					77	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	392			583		
D. Inspection, maintenance or repair without refuelling				7		
E. Testing of plant systems or components	5					
H. Nuclear regulatory requirements					43	7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					8	3
L. Human factor related		162			5	
Z. Others					13	
Subtotal	397	162	0	590	159	10
Total		559			759	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
13. Reactor Auxiliary Systems			7
16. Steam generation systems			2
31. Turbine and auxiliaries			0
32. Feedwater and Main Steam System			0
41. Main Generator Systems			66
Total	0		75

DE-13 BRUNSBUETTEL (KKB)

Operator: KKB (Kernkraftwerk Brunsbüttel GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 771.0 MW(e)
 Design Net Capacity: 770.0 MW(e)
 Design Discharge Burnup: 27500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
 Energy Availability Factor: 0.0%
 Load Factor: 0.0%
 Operating Factor: 0.0%
 Energy Unavailability Factor: 100.0%
 Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

BRUNSBUETTEL WAS SHUTDOWN FOR THE WHOLE YEAR BECAUSE INSPECTIONS SAFETY-RELATED IMPORTANT MOUNTINGS RESPECTIVELY BONDING DOWELS.

5. Historical Summary

Date of Construction Start: 15/04/1970
 Date of First Criticality: 23/06/1976
 Date of Grid Connection: 13/07/1976
 Date of Commercial Operation: 02 Sep 1977

Lifetime Generation: 120371.3 GW(e).h
 Cumulative Energy Availability Factor: 55.6%
 Cumulative Load Factor: 52.0%
 Cumulative Unit Capability Factor: 56.5%
 Cumulative Energy Unavailability Factor: 44.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	2925.9	770	47.4	47.4	47.4	47.4	47.4	47.4	4043	50.4
1978	2333.5	770	34.5	40.7	34.5	40.7	34.6	40.7	3405	38.9
1979	0.0	770	0.0	26.7	0.0	26.7	0.0	26.7	0	0.0
1980	714.9	770	11.3	22.8	11.3	22.8	10.6	22.6	1354	15.4
1981	4462.4	770	66.4	31.6	66.4	31.6	66.2	31.5	7432	84.8
1982	3439.2	770	51.1	34.9	51.1	34.9	51.0	34.8	5007	57.2
1983	2416.0	770	34.2	34.8	34.2	34.8	35.8	34.9	3241	37.0
1984	5334.0	770	78.9	40.4	78.9	40.4	78.9	40.5	7549	85.9
1985	5625.3	770	83.1	45.2	83.1	45.2	83.4	45.3	7661	87.5
1986	5630.9	771	86.1	49.3	86.1	49.3	83.4	49.1	7802	89.1
1987	5233.8	771	85.9	52.7	85.9	52.7	77.5	51.7	7837	89.5
1988	5085.3	771	85.4	55.4	85.4	55.4	75.1	53.7	7800	88.8
1989	4097.2	771	71.6	56.7	71.6	56.7	60.7	54.2	6730	76.8
1990	4780.3	771	93.8	59.4	93.8	59.4	70.8	55.4	8527	97.3
1991	3819.3	771	80.8	60.8	61.2	59.5	56.5	55.5	6317	72.1
1992	3487.4	771	57.4	60.6	57.4	59.3	51.5	55.2	5425	61.8
1993	0.0	771	0.0	57.0	0.0	55.8	0.0	52.0	0	0.0
1994	0.0	771	0.0	53.8	0.0	52.7	0.0	49.1	0	0.0
1995	3001.0	771	51.4	53.7	51.3	52.6	44.4	48.8	4750	54.2
1996	4696.4	771	77.9	54.9	74.7	53.8	69.3	49.9	7255	82.6
1997	5102.9	771	97.4	56.9	97.4	55.8	75.6	51.1	8760	100.0
1998	3993.9	771	64.7	57.3	64.7	56.2	59.1	51.5	5712	65.2
1999	6219.8	771	93.6	58.9	93.6	57.9	92.1	53.2	8290	94.6
2000	5784.8	771	93.8	60.3	93.8	59.4	85.4	54.6	8295	94.4
2001	5764.3	771	93.1	61.7	86.8	60.5	85.3	55.8	8202	93.6
2002	860.0	771	13.1	59.8	13.1	58.7	12.7	54.2	1167	13.3
2003	4905.8	771	76.3	60.4	76.3	59.3	72.6	54.8	6688	76.3
2004	4873.2	771	73.3	60.9	73.3	59.8	72.0	55.5	6504	74.0
2005	6027.2	771	90.3	61.9	89.0	60.8	89.2	56.6	7989	91.2
2006	5967.4	771	89.8	62.8	88.5	61.8	88.4	57.7	7958	90.8
2007	2487.9	771	38.2	62.0	38.2	61.0	36.8	57.0	3362	38.4
2008	0.0	771	0.0	60.1	0.0	59.1	0.0	55.2	0	0.0
2009	0.0	771	0.0	58.2	0.0	57.3	0.0	53.5	0	0.0
2010	0.0	771	0.0	56.5	0.0	55.6	0.0	52.0	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					1267	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				591	12	
D. Inspection, maintenance or repair without refuelling				394		
E. Testing of plant systems or components				0	2	
H. Nuclear regulatory requirements		8760		0	605	24
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
M. Governmental requirements or court decisions						5
Z. Others					57	
Subtotal	0	8760	0	985	1946	31
Total		8760			2962	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		647
15. Reactor Cooling Systems		94
16. Steam generation systems		43
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		418
32. Feedwater and Main Steam System		0
35. All other I&C Systems		0
41. Main Generator Systems		7
42. Electrical Power Supply Systems		44
Total	0	1256

DE-33 EMSLAND (KKE)

Operator: KLE (Kernkraftwerke Lippe-Ems GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1329.0 MW(e)
 Design Net Capacity: 1242.0 MW(e)
 Design Discharge Burnup: 32000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10978.0 GW(e).h
 Energy Availability Factor: 94.4%
 Load Factor: 94.3%
 Operating Factor: 94.6%
 Energy Unavailability Factor: 5.6%
 Total Off-line Time: 474 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1000.4	901.0	984.8	950.3	992.2	316.5	961.1	973.0	951.0	990.0	958.5	999.2	10978.0
EAF (%)	100.0	100.0	100.0	99.7	100.0	33.4	99.1	100.0	100.0	100.0	100.0	100.0	94.4
UCF (%)	100.0	100.0	100.0	99.7	100.0	33.5	99.1	100.0	100.0	100.0	100.0	100.0	94.4
LF (%)	101.2	100.9	99.7	99.3	100.3	33.1	97.2	98.4	99.4	100.0	100.2	101.0	94.3
OF (%)	100.0	100.0	100.0	100.0	100.0	34.7	99.5	100.0	100.0	100.0	100.0	100.0	94.6
EUF (%)	0.0	0.0	0.0	0.3	0.0	66.6	0.9	0.0	0.0	0.0	0.0	0.0	5.6
PUF (%)	0.0	0.0	0.0	0.3	0.0	66.5	0.0	0.0	0.0	0.0	0.0	0.0	5.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 08 Oct 1982
 Date of First Criticality: 14/04/1988
 Date of Grid Connection: 19/04/1988
 Date of Commercial Operation: 20/06/1988

Lifetime Generation: 242541.8 GW(e).h
 Cumulative Energy Availability Factor: 93.4%
 Cumulative Load Factor: 93.3%
 Cumulative Unit Capability Factor: 93.5%
 Cumulative Energy Unavailability Factor: 6.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	5694.9	1262	96.8	96.8	96.8	96.8	89.3	89.3	4516	87.9
1989	9857.2	1242	88.7	91.7	88.7	91.7	90.6	90.1	7794	89.0
1990	10039.2	1256	90.4	91.2	90.4	91.2	91.2	90.5	7956	90.8
1991	9287.3	1242	82.0	88.6	82.0	88.6	85.4	89.1	7304	83.4
1992	10158.0	1290	90.2	89.0	90.2	89.0	89.6	89.2	7933	90.3
1993	10477.1	1290	92.9	89.7	92.9	89.7	92.7	89.9	8147	93.0
1994	10526.7	1290	93.4	90.3	93.4	90.3	93.2	90.4	8193	93.5
1995	10495.7	1290	93.1	90.6	93.1	90.6	92.9	90.7	8168	93.2
1996	10557.3	1290	93.2	90.9	93.2	90.9	93.2	91.0	8195	93.3
1997	10650.2	1290	94.6	91.3	94.6	91.3	94.2	91.3	8298	94.7
1998	10794.7	1290	95.7	91.7	95.7	91.7	95.5	91.7	8388	95.8
1999	10729.2	1290	96.0	92.1	96.0	92.1	94.9	92.0	8413	96.0
2000	10802.0	1306	94.9	92.3	94.9	92.3	94.1	92.2	8339	94.9
2001	10933.2	1329	94.1	92.5	93.8	92.4	93.9	92.3	8257	94.3
2002	11242.3	1329	96.9	92.8	96.9	92.8	96.6	92.6	8497	97.0
2003	11097.0	1329	95.8	93.0	95.8	93.0	95.3	92.8	8401	95.9
2004	11147.2	1329	96.1	93.2	96.1	93.2	95.5	93.0	8456	96.3
2005	10887.8	1329	93.9	93.2	93.9	93.2	93.5	93.0	8239	94.0
2006	11147.6	1329	96.4	93.4	95.8	93.3	95.8	93.2	8461	96.6
2007	10989.2	1329	94.7	93.5	94.4	93.4	94.4	93.2	8311	94.9
2008	10896.2	1329	93.4	93.5	93.4	93.4	93.3	93.2	8211	93.5
2009	10849.2	1329	93.3	93.5	93.2	93.4	93.2	93.2	8194	93.5
2010	10978.0	1329	94.4	93.5	94.4	93.4	94.3	93.3	8286	94.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		4			34	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	470			451		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
L. Human factor related					3	
Z. Others					2	
Subtotal	470	4	0	451	39	0
Total		474			490	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		9
13. Reactor Auxiliary Systems	4	
15. Reactor Cooling Systems		14
31. Turbine and auxiliaries		3
41. Main Generator Systems		6
42. Electrical Power Supply Systems		0
Total	4	32

DE-23 GRAFENRHEINFELD (KKG)

Operator: E.ON (E.ON Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1275.0 MW(e)
 Design Net Capacity: 1225.0 MW(e)
 Design Discharge Burnup: 34000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7492.6 GW(e).h
 Energy Availability Factor: 67.4%
 Load Factor: 67.1%
 Operating Factor: 67.9%
 Energy Unavailability Factor: 32.6%
 Total Off-line Time: 2812 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	952.1	851.3	167.2	0.0	0.0	81.6	925.1	932.4	882.3	829.4	917.2	953.9	7492.6
EAF (%)	99.8	99.7	17.8	0.0	0.0	8.9	99.7	100.0	97.3	87.3	100.0	99.9	67.4
UCF (%)	99.9	99.7	17.8	0.0	0.0	8.9	99.7	100.0	97.3	87.3	100.0	99.9	67.4
LF (%)	100.4	99.4	17.6	0.0	0.0	8.9	97.5	98.3	96.1	87.3	99.9	100.6	67.1
OF (%)	100.0	100.0	18.4	0.0	0.0	11.7	100.0	100.0	97.5	88.2	100.0	100.0	67.9
EUf (%)	0.2	0.3	82.2	100.0	100.0	91.1	0.3	0.0	2.7	12.7	0.0	0.1	32.6
PUf (%)	0.1	0.2	82.2	100.0	77.0	0.0	0.3	0.0	0.2	0.0	0.0	0.1	21.8
UCLF (%)	0.1	0.0	0.0	0.0	23.0	91.1	0.0	0.0	2.5	12.7	0.0	0.0	10.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 01 Jan 1975
 Date of First Criticality: 12 Sep 1981
 Date of Grid Connection: 30/12/1981
 Date of Commercial Operation: 17/06/1982

Lifetime Generation: 273444.1 GW(e).h
 Cumulative Energy Availability Factor: 87.6%
 Cumulative Load Factor: 86.0%
 Cumulative Unit Capability Factor: 87.7%
 Cumulative Energy Unavailability Factor: 12.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	6199.2	1229	98.3	98.3	98.3	98.3	98.2	98.2	5122	99.7
1983	9412.0	1229	87.5	91.5	87.5	91.5	87.4	91.4	7898	90.2
1984	9590.0	1229	88.7	90.4	88.7	90.4	88.8	90.4	7890	89.8
1985	9741.6	1235	90.6	90.4	90.6	90.4	90.0	90.3	8155	93.1
1986	8718.2	1235	80.9	88.3	80.9	88.3	80.6	88.2	7179	82.0
1987	8360.6	1235	77.8	86.5	77.8	86.5	77.3	86.2	7509	85.7
1988	8799.9	1235	84.3	86.1	84.3	86.1	81.1	85.5	7604	86.6
1989	9401.7	1235	88.0	86.4	88.0	86.4	86.9	85.6	7840	89.5
1990	7910.3	1235	73.5	84.9	73.5	84.9	73.1	84.2	6743	77.0
1991	9753.5	1235	92.5	85.7	92.5	85.7	90.2	84.8	8114	92.6
1992	9657.2	1235	91.8	86.3	91.8	86.3	89.0	85.2	8074	91.9
1993	8845.9	1235	84.5	86.1	84.5	86.1	81.8	84.9	7524	85.9
1994	9674.5	1275	88.8	86.3	88.8	86.3	86.6	85.0	8116	92.6
1995	9946.0	1275	93.5	86.9	93.5	86.9	89.1	85.4	8193	93.5
1996	9528.6	1275	89.1	87.0	89.1	87.0	85.1	85.3	7886	89.8
1997	10131.0	1275	93.5	87.5	93.5	87.4	90.7	85.7	8202	93.6
1998	9147.0	1275	84.6	87.3	84.6	87.3	81.9	85.5	7429	84.8
1999	8336.7	1275	76.1	86.6	76.1	86.6	74.6	84.8	6737	76.9
2000	9600.9	1275	89.1	86.8	89.1	86.8	85.7	84.9	7829	89.1
2001	10573.9	1275	95.7	87.2	95.7	87.2	94.7	85.4	8392	95.8
2002	9889.9	1275	91.0	87.4	91.0	87.4	88.5	85.5	7977	91.1
2003	10270.2	1275	93.4	87.7	93.4	87.7	92.0	85.8	8196	93.6
2004	10129.4	1275	91.6	87.9	91.6	87.9	90.4	86.0	8059	91.7
2005	10106.0	1275	91.8	88.0	91.5	88.0	90.5	86.2	8046	91.8
2006	9424.9	1275	85.2	87.9	84.9	87.9	84.4	86.2	7588	86.6
2007	10311.5	1275	93.6	88.1	93.4	88.1	92.3	86.4	8236	94.0
2008	9763.0	1275	88.9	88.2	88.4	88.1	87.2	86.4	7828	89.1
2009	10447.3	1275	94.4	88.4	94.4	88.4	93.5	86.7	8282	94.5
2010	7492.6	1275	67.4	87.7	67.4	87.6	67.1	86.0	5948	67.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		106			171	
C. Inspection, maintenance or repair combined with refuelling	1899			716	4	
L. Human factor related		807				
Z. Others					5	
Subtotal	1899	913	0	716	180	0
Total		2812			896	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		15
14. Safety Systems		0
15. Reactor Cooling Systems		39
16. Steam generation systems		21
31. Turbine and auxiliaries		25
32. Feedwater and Main Steam System		15
41. Main Generator Systems		53
42. Electrical Power Supply Systems	106	
Total	106	168

DE-27 GROHNDE (KWG)

Operator: KWG (Gemeinschaftskernkraftwerk Grohnde GmbH & Co. oHG)
Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1360.0 MW(e)
Design Net Capacity: 1289.0 MW(e)
Design Discharge Burnup: 34000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10782.4 GW(e).h
Energy Availability Factor: 92.0%
Load Factor: 90.5%
Operating Factor: 94.4%
Energy Unavailability Factor: 8.0%
Total Off-line Time: 493 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	995.8	884.3	983.0	286.0	972.1	918.5	928.6	947.1	942.0	967.2	951.1	1006.8	10782.4
EAF (%)	99.4	98.3	98.6	29.4	98.0	95.6	93.9	95.5	97.1	98.1	99.2	100.0	92.0
UCF (%)	100.0	98.8	99.4	30.0	99.9	100.0	100.0	100.0	100.0	99.9	100.0	100.0	94.1
LF (%)	98.4	96.8	97.3	29.2	96.1	93.8	91.8	93.6	96.2	95.5	97.1	99.5	90.5
OF (%)	100.0	100.0	100.0	31.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.4
EUf (%)	0.6	1.7	1.4	70.6	2.0	4.4	6.1	4.5	2.9	1.9	0.8	0.0	8.0
PUf (%)	0.0	0.0	0.0	58.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8
UCLF (%)	0.0	1.2	0.6	11.7	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	1.1
XUF (%)	0.6	0.5	0.8	0.6	1.9	4.4	6.1	4.5	2.9	1.8	0.8	0.0	2.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1976
Date of First Criticality: 09 Jan 1984
Date of Grid Connection: 09 May 1984
Date of Commercial Operation: 02 Jan 1985

Lifetime Generation: 278663.1 GW(e).h
Cumulative Energy Availability Factor: 92.3%
Cumulative Load Factor: 90.8%
Cumulative Unit Capability Factor: 92.6%
Cumulative Energy Unavailability Factor: 7.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	9896.4	1300	95.2	95.2	95.2	95.2	95.0	95.0	7662	95.6
1986	10205.4	1300	89.7	92.3	89.7	92.3	89.6	92.2	8120	92.7
1987	9648.5	1300	86.4	90.3	86.4	90.3	84.7	89.6	7979	91.1
1988	10208.3	1300	90.8	90.4	90.8	90.4	89.4	89.6	8104	92.3
1989	10279.4	1300	90.3	90.4	90.3	90.4	90.3	89.7	8058	92.0
1990	10123.6	1314	88.1	90.0	88.1	90.0	87.9	89.4	7872	89.9
1991	9957.8	1325	86.4	89.5	86.4	89.5	85.8	88.9	7603	86.8
1992	10424.3	1325	90.0	89.6	90.0	89.6	89.6	89.0	7981	90.9
1993	10680.1	1325	92.8	89.9	92.8	89.9	92.0	89.3	8147	93.0
1994	10266.5	1325	91.9	90.1	91.9	90.1	88.5	89.2	8063	92.0
1995	10771.2	1349	91.1	90.2	91.1	90.2	91.1	89.4	7986	91.2
1996	10589.8	1360	88.9	90.1	88.9	90.1	88.6	89.3	7861	89.5
1997	11864.7	1360	100.0	90.9	100.0	90.9	99.6	90.1	8760	100.0
1998	11146.3	1360	94.5	91.2	94.5	91.2	93.6	90.4	8301	94.8
1999	11212.1	1360	95.3	91.4	95.3	91.4	94.1	90.7	8351	95.3
2000	11055.9	1360	93.7	91.6	93.7	91.6	92.5	90.8	8250	93.9
2001	10926.6	1360	94.7	91.8	94.2	91.7	91.7	90.8	8310	94.9
2002	10791.9	1360	93.8	91.9	93.8	91.9	90.6	90.8	8233	94.0
2003	10933.0	1360	95.0	92.1	95.0	92.0	91.8	90.9	8343	95.2
2004	10695.4	1360	93.6	92.1	93.6	92.1	89.5	90.8	8245	93.9
2005	10840.9	1360	95.1	92.3	94.5	92.2	91.0	90.8	8364	95.5
2006	10995.7	1360	94.5	92.4	94.2	92.3	92.3	90.9	8296	94.7
2007	10818.4	1360	94.1	92.5	93.6	92.4	90.8	90.9	8270	94.4
2008	10545.9	1360	91.3	92.4	91.0	92.3	88.3	90.8	8048	91.6
2009	10867.5	1360	94.4	92.5	92.0	92.3	91.2	90.8	8288	94.6
2010	10782.4	1360	94.1	92.6	92.0	92.3	90.5	90.8	8267	94.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					54	
C. Inspection, maintenance or repair combined with refuelling	408			473	4	
D. Inspection, maintenance or repair without refuelling				2		
L. Human factor related		85				
Z. Others					10	
Subtotal	408	85	0	475	68	0
Total		493			543	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		3
15. Reactor Cooling Systems		9
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		1
35. All other I&C Systems		0
41. Main Generator Systems		27
42. Electrical Power Supply Systems		4
Total	0	50

DE-26 GUNDREMMINGEN-B (GUN-B)

Operator: KGG (Kernkraftwerk Gundremmingen GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1284.0 MW(e)
 Design Net Capacity: 1244.0 MW(e)
 Design Discharge Burnup: 27500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9460.8 GW(e).h
 Energy Availability Factor: 83.2%
 Load Factor: 84.1%
 Operating Factor: 84.0%
 Energy Unavailability Factor: 16.8%
 Total Off-line Time: 1398 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	975.2	878.3	962.7	928.9	961.8	819.2	0.0	557.3	931.9	944.8	524.9	975.7	9460.8
EAF (%)	100.0	100.0	100.0	99.5	100.0	88.9	0.0	58.4	100.0	98.1	55.8	100.0	83.2
UCF (%)	100.0	100.0	100.0	99.5	100.0	89.0	0.0	58.4	100.0	98.1	55.9	100.0	83.2
LF (%)	102.1	101.8	100.9	100.5	100.7	88.6	0.0	58.3	100.8	98.8	56.8	102.1	84.1
OF (%)	100.0	100.0	100.0	100.0	100.0	89.4	0.0	63.6	100.0	98.7	58.8	100.0	84.0
EUf (%)	0.0	0.0	0.0	0.5	0.0	11.1	100.0	41.6	0.0	1.9	44.2	0.0	16.8
PUF (%)	0.0	0.0	0.0	0.5	0.0	11.1	100.0	8.3	0.0	0.0	0.0	0.0	10.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	1.9	44.2	0.0	6.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 20/07/1976
 Date of First Criticality: 03 Sep 1984
 Date of Grid Connection: 16/03/1984
 Date of Commercial Operation: 19/07/1984
 Lifetime Generation: 246110.8 GW(e).h
 Cumulative Energy Availability Factor: 88.1%
 Cumulative Load Factor: 83.1%
 Cumulative Unit Capability Factor: 88.4%
 Cumulative Energy Unavailability Factor: 11.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	4656.0	1250	85.3	85.3	85.3	85.3	84.7	84.7	3958	89.6
1985	9147.5	1244	85.5	85.4	85.5	85.4	83.9	84.2	7852	89.6
1986	8298.3	1244	83.1	84.5	83.1	84.5	76.1	81.0	7434	84.9
1987	8413.2	1240	84.4	84.5	84.4	84.5	77.5	80.0	7876	89.9
1988	7079.3	1240	83.6	84.3	83.6	84.3	65.0	76.7	7706	87.7
1989	9653.7	1240	97.9	86.8	97.9	86.8	88.9	78.9	8743	99.8
1990	8442.3	1240	83.6	86.3	83.6	86.3	77.7	78.7	7717	88.1
1991	8002.7	1240	77.7	85.1	74.8	84.7	73.7	78.0	7520	85.8
1992	7366.8	1240	78.4	84.3	78.4	84.0	67.6	76.8	7073	80.5
1993	8015.8	1240	84.9	84.4	84.9	84.1	73.8	76.5	7632	87.1
1994	8825.6	1240	92.1	85.1	91.7	84.8	81.2	76.9	8213	93.8
1995	8681.7	1284	84.7	85.1	84.7	84.8	77.2	77.0	7535	86.0
1996	9370.9	1284	88.6	85.4	88.6	85.1	83.1	77.5	7903	90.0
1997	9206.1	1284	92.8	85.9	92.8	85.7	81.8	77.8	8264	94.3
1998	9072.1	1284	89.2	86.2	89.2	85.9	80.7	78.0	7996	91.3
1999	9595.4	1284	93.3	86.6	93.3	86.4	85.3	78.5	8257	94.3
2000	9336.4	1284	88.8	86.8	88.8	86.6	82.8	78.7	7887	89.8
2001	10216.7	1284	94.8	87.2	94.8	87.1	90.8	79.5	8405	95.9
2002	9976.9	1284	92.1	87.5	92.1	87.3	88.7	80.0	8139	92.9
2003	10480.4	1284	94.4	87.9	94.4	87.7	93.2	80.7	8325	95.0
2004	10283.1	1284	91.3	88.0	91.3	87.9	91.2	81.2	8208	93.4
2005	10299.9	1284	92.3	88.2	91.5	88.1	91.6	81.7	8145	93.0
2006	10085.8	1284	90.1	88.3	89.4	88.1	89.7	82.0	7963	90.9
2007	10496.5	1284	94.1	88.6	92.9	88.3	93.3	82.5	8299	94.7
2008	9669.9	1284	85.1	88.4	85.1	88.2	85.7	82.6	7568	86.2
2009	10389.9	1284	92.0	88.6	92.0	88.3	92.4	83.0	8111	92.6
2010	9460.8	1284	83.2	88.4	83.2	88.1	84.1	83.1	7362	84.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		527			29	
B. Refuelling without a maintenance				6	0	
C. Inspection, maintenance or repair combined with refuelling	868			691	1	
D. Inspection, maintenance or repair without refuelling				11		
E. Testing of plant systems or components	3			0		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				4		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	
L. Human factor related					1	
Subtotal	871	527	0	712	35	0
Total		1398			747	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	307	3
12. Reactor I&C Systems	46	
13. Reactor Auxiliary Systems		0
14. Safety Systems		0
15. Reactor Cooling Systems		1
16. Steam generation systems		5
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System	174	8
41. Main Generator Systems		0
Total	527	26

DE-28 GUNDREMMINGEN-C (GUN-C)

Operator: KGG (Kernkraftwerk Gundremmingen GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1288.0 MW(e)
 Design Net Capacity: 1249.0 MW(e)
 Design Discharge Burnup: 27500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10394.8 GW(e).h
 Energy Availability Factor: 91.7%
 Load Factor: 92.1%
 Operating Factor: 92.8%
 Energy Unavailability Factor: 8.3%
 Total Off-line Time: 635 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	972.4	870.4	961.0	911.1	952.9	917.8	934.2	934.8	924.2	115.7	929.3	970.8	10394.8
EAF (%)	100.0	99.4	100.0	98.0	99.2	99.2	97.5	97.6	100.0	12.1	99.7	100.0	91.7
UCF (%)	100.0	99.4	100.0	98.1	99.2	100.0	99.3	99.1	100.0	12.1	99.7	100.0	92.1
LF (%)	101.5	100.6	100.4	98.2	99.4	99.0	97.5	97.6	99.7	12.1	100.2	101.3	92.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	14.8	100.0	100.0	92.8
EUf (%)	0.0	0.6	0.0	2.0	0.8	0.8	2.5	2.4	0.0	87.9	0.3	0.0	8.3
PUf (%)	0.0	0.6	0.0	1.9	0.0	0.0	0.0	0.9	0.0	80.9	0.1	0.0	7.2
UCLF (%)	0.0	0.0	0.0	0.1	0.8	0.0	0.7	0.0	0.0	7.0	0.2	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.8	1.8	1.5	0.0	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 20/07/1976
 Date of First Criticality: 26/10/1984
 Date of Grid Connection: 11 Feb 1984
 Date of Commercial Operation: 18/01/1985

Lifetime Generation: 237485.0 GW(e).h
 Cumulative Energy Availability Factor: 87.0%
 Cumulative Load Factor: 81.2%
 Cumulative Unit Capability Factor: 87.3%
 Cumulative Energy Unavailability Factor: 13.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	9149.6	1244	85.5	85.5	85.5	85.5	84.0	84.0	7663	87.5
1986	8018.5	1244	84.7	85.1	84.7	85.1	73.6	78.8	7945	90.7
1987	7333.2	1248	74.7	81.6	74.7	81.6	67.1	74.9	7345	83.8
1988	7456.1	1248	88.3	83.3	88.3	83.3	68.0	73.1	7887	89.8
1989	7884.5	1248	84.2	83.5	84.2	83.5	72.1	72.9	7722	88.2
1990	8264.8	1248	80.2	82.9	80.2	82.9	75.6	73.4	7519	85.8
1991	8341.3	1248	85.9	83.3	85.9	83.3	76.3	73.8	7709	88.0
1992	9381.0	1248	98.9	85.3	98.9	85.3	85.6	75.3	8784	100.0
1993	6689.2	1248	79.1	84.6	79.1	84.6	61.2	73.7	7051	80.5
1994	7502.0	1248	81.1	84.3	80.7	84.2	68.6	73.2	7147	81.6
1995	9376.7	1288	89.3	84.7	89.3	84.7	83.1	74.1	7929	90.5
1996	9509.0	1288	91.7	85.3	91.7	85.3	84.0	75.0	8176	93.1
1997	9013.6	1288	89.1	85.6	88.7	85.6	79.9	75.4	7861	89.7
1998	9629.5	1288	91.5	86.1	91.5	86.0	85.3	76.1	8153	93.1
1999	8187.6	1288	77.0	85.4	77.0	85.4	72.6	75.9	6942	79.2
2000	10176.8	1288	94.6	86.0	94.6	86.0	90.0	76.8	8375	95.3
2001	9838.4	1288	90.7	86.3	87.2	86.0	87.2	77.4	8016	91.5
2002	10335.8	1288	93.4	86.7	93.4	86.5	91.6	78.2	8301	94.8
2003	9965.6	1288	89.2	86.8	89.2	86.6	88.3	78.7	7931	90.5
2004	8470.5	1288	74.9	86.2	74.9	86.0	74.9	78.5	6747	76.8
2005	10015.6	1288	92.6	86.5	89.2	86.2	88.8	79.0	8158	93.1
2006	10543.0	1288	93.9	86.9	93.7	86.5	93.4	79.7	8289	94.6
2007	9888.3	1288	87.4	86.9	87.4	86.6	87.6	80.0	7729	88.2
2008	9929.0	1288	87.5	86.9	87.3	86.6	87.8	80.4	7737	88.1
2009	10275.2	1288	91.1	87.1	90.9	86.8	91.1	80.8	8036	91.7
2010	10394.8	1288	92.1	87.3	91.7	87.0	92.1	81.2	8125	92.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					171	
B. Refuelling without a maintenance				29	0	
C. Inspection, maintenance or repair combined with refuelling	583			689		
D. Inspection, maintenance or repair without refuelling				19		
E. Testing of plant systems or components					1	
L. Human factor related		52			3	
Subtotal	583	52	0	737	175	0
Total		635			912	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		7
14. Safety Systems		13
15. Reactor Cooling Systems		8
16. Steam generation systems		4
31. Turbine and auxiliaries		31
32. Feedwater and Main Steam System		0
41. Main Generator Systems		104
Total	0	167

DE-16 ISAR-1 (KKI 1)

Operator: E.ON (E.ON Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 878.0 MW(e)
 Design Net Capacity: 870.0 MW(e)
 Design Discharge Burnup: 27500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6285.2 GW(e).h
 Energy Availability Factor: 81.9%
 Load Factor: 81.7%
 Operating Factor: 85.2%
 Energy Unavailability Factor: 18.1%
 Total Off-line Time: 1296 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	652.0	354.7	641.6	625.0	648.1	613.0	610.7	573.1	160.0	120.9	635.2	650.8	6285.2
EAF (%)	99.8	60.5	98.3	99.1	99.9	98.4	94.0	87.8	25.4	18.5	100.0	98.7	81.9
UCF (%)	100.0	60.7	98.3	99.1	100.0	98.8	99.9	93.5	26.9	18.5	100.0	98.7	83.1
LF (%)	99.8	60.1	98.4	98.9	99.2	97.0	93.5	87.7	25.3	18.5	100.5	99.6	81.7
OF (%)	100.0	65.2	100.0	100.0	100.0	99.4	100.0	100.0	31.3	24.4	100.0	100.0	85.2
EUUF (%)	0.2	39.5	1.7	0.9	0.1	1.6	6.0	12.2	74.6	81.5	0.0	1.3	18.1
PUF (%)	0.0	32.5	0.0	0.9	0.0	0.0	0.0	0.0	68.0	61.2	0.0	0.0	13.4
UCLF (%)	0.0	6.8	1.7	0.0	0.0	1.3	0.1	6.5	5.0	20.3	0.0	1.3	3.6
XUF (%)	0.2	0.2	0.0	0.0	0.1	0.4	5.9	5.7	1.5	0.0	0.0	0.0	1.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 05 Jan 1972
 Date of First Criticality: 20/11/1977
 Date of Grid Connection: 12 Mar 1977
 Date of Commercial Operation: 21/03/1979

Lifetime Generation: 196707.1 GW(e).h
 Cumulative Energy Availability Factor: 82.9%
 Cumulative Load Factor: 79.4%
 Cumulative Unit Capability Factor: 83.3%
 Cumulative Energy Unavailability Factor: 17.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	4503.0	870	70.5	70.5	70.5	70.5	70.5	70.5	5969	81.3
1980	4202.0	870	55.2	62.1	55.2	62.1	55.0	62.0	5791	65.9
1981	4155.9	870	53.7	59.2	53.7	59.2	54.5	59.4	5880	67.1
1982	1603.3	870	21.1	49.3	21.1	49.3	21.0	49.4	2232	25.5
1983	7143.0	870	93.9	58.5	93.9	58.5	93.7	58.6	8627	98.5
1984	5587.0	870	73.2	61.0	73.2	61.0	73.1	61.1	7262	82.7
1985	6515.6	870	86.0	64.7	86.0	64.7	85.5	64.6	8006	91.4
1986	6370.4	870	83.4	67.0	83.4	67.0	83.6	67.0	7871	89.9
1987	7164.7	870	93.6	70.1	93.6	70.1	94.0	70.1	8335	95.1
1988	5639.1	870	82.3	71.3	82.3	71.3	73.8	70.5	7674	87.4
1989	5205.3	870	74.4	71.6	74.4	71.6	68.3	70.3	7233	82.6
1990	5054.8	870	74.2	71.8	74.2	71.8	66.3	69.9	7577	86.5
1991	6760.6	870	94.9	73.6	94.9	73.6	88.7	71.4	8381	95.7
1992	5872.0	870	89.4	74.7	89.4	74.7	76.8	71.8	7903	90.0
1993	5575.2	870	85.5	75.5	85.5	75.5	73.2	71.9	7553	86.2
1994	5150.3	870	73.5	75.3	73.5	75.3	67.6	71.6	6462	73.8
1995	6446.0	870	94.7	76.5	94.7	76.5	84.6	72.4	8306	94.8
1996	5816.3	870	86.2	77.0	86.2	77.0	76.1	72.6	7674	87.4
1997	5998.4	870	91.5	77.8	91.5	77.8	78.7	72.9	8059	92.0
1998	6335.8	870	89.3	78.4	89.2	78.4	83.1	73.4	7857	89.7
1999	7532.1	870	98.7	79.4	98.7	79.3	98.8	74.6	8736	99.7
2000	6646.0	874	90.8	79.9	90.8	79.9	86.5	75.2	8231	93.7
2001	5889.0	878	82.4	80.0	76.2	79.7	76.6	75.3	7353	83.9
2002	7566.2	878	98.6	80.8	98.6	80.5	98.4	76.2	8731	99.7
2003	6301.4	878	87.4	81.0	87.4	80.8	81.9	76.5	7773	88.7
2004	6771.1	878	89.1	81.4	89.1	81.1	87.8	76.9	7984	90.9
2005	7336.9	878	96.1	81.9	95.2	81.6	95.4	77.6	8546	97.5
2006	6808.1	878	91.4	82.3	89.4	81.9	88.5	78.0	8064	92.1
2007	6755.8	878	90.5	82.5	88.6	82.2	87.8	78.3	8086	92.3
2008	7582.6	878	98.7	83.1	98.3	82.7	98.3	79.0	8784	100.0
2009	6796.0	878	89.0	83.3	88.5	82.9	88.4	79.3	8076	92.2
2010	6285.2	878	83.1	83.3	81.9	82.9	81.7	79.4	7464	85.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		19			133	
B. Refuelling without a maintenance				6		
C. Inspection, maintenance or repair combined with refuelling	936			833	2	
D. Inspection, maintenance or repair without refuelling	224			82		
E. Testing of plant systems or components				91		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				1		
H. Nuclear regulatory requirements					22	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				8	0	0
L. Human factor related		117			6	
Z. Others					10	
Subtotal	1160	136	0	1021	173	0
Total		1296			1194	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		12
15. Reactor Cooling Systems		26
21. Fuel Handling and Storage Facilities		6
31. Turbine and auxiliaries	4	24
32. Feedwater and Main Steam System		4
35. All other I&C Systems	15	
41. Main Generator Systems		17
42. Electrical Power Supply Systems		27
Total	19	116

DE-31 ISAR-2 (KKI 2)

Operator: E.ON (E.ON Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1410.0 MW(e)
 Design Net Capacity: 1285.0 MW(e)
 Design Discharge Burnup: 32000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11375.3 GW(e).h
 Energy Availability Factor: 93.0%
 Load Factor: 92.1%
 Operating Factor: 93.2%
 Energy Unavailability Factor: 7.0%
 Total Off-line Time: 598 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1057.3	954.0	1039.6	1007.8	1021.6	814.9	355.3	1009.2	993.0	1047.9	1010.7	1064.1	11375.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	82.5	34.4	100.0	100.0	100.0	100.0	100.0	93.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	82.5	34.4	100.0	100.0	100.0	100.0	100.0	93.0
LF (%)	100.8	100.7	99.2	99.3	97.4	80.3	33.9	96.2	97.8	99.8	99.6	101.4	92.1
OF (%)	100.0	100.0	100.0	100.0	100.0	83.3	35.8	100.0	100.0	100.0	100.0	100.0	93.2
EUf (%)	0.0	0.0	0.0	0.0	0.0	17.5	65.6	0.0	0.0	0.0	0.0	0.0	7.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	17.5	51.4	0.0	0.0	0.0	0.0	0.0	5.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	14.2	0.0	0.0	0.0	0.0	0.0	1.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 15/09/1982
 Date of First Criticality: 15/01/1988
 Date of Grid Connection: 22/01/1988
 Date of Commercial Operation: 04 Sep 1988

Lifetime Generation: 244930.3 GW(e).h
 Cumulative Energy Availability Factor: 92.0%
 Cumulative Load Factor: 89.2%
 Cumulative Unit Capability Factor: 92.3%
 Cumulative Energy Unavailability Factor: 8.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	6023.0	1323	95.1	95.1	95.1	95.1	69.7	69.7	6177	93.6
1989	7728.9	1310	73.4	82.7	73.4	82.7	67.4	68.3	6876	78.5
1990	9271.4	1310	84.9	83.5	84.9	83.5	80.8	72.9	7915	90.4
1991	9699.2	1318	87.8	84.7	87.8	84.7	84.0	75.8	7732	88.3
1992	9843.5	1320	89.9	85.8	89.9	85.8	84.9	77.8	7917	90.1
1993	10193.0	1330	91.3	86.7	88.1	86.2	87.5	79.5	8052	91.9
1994	10499.9	1330	93.1	87.7	93.1	87.2	90.1	81.1	8209	93.7
1995	10040.3	1332	89.8	88.0	89.8	87.6	86.0	81.7	7891	90.1
1996	10265.1	1338	90.7	88.3	88.5	87.7	87.3	82.3	7989	90.9
1997	10906.4	1365	94.1	88.9	94.1	88.4	91.2	83.3	8258	94.3
1998	10758.1	1365	93.6	89.4	93.6	88.9	90.0	83.9	8356	95.4
1999	11610.9	1380	96.5	90.0	96.5	89.5	96.0	85.0	8465	96.6
2000	11291.1	1400	94.5	90.4	94.5	89.9	91.8	85.5	8311	94.6
2001	11731.3	1400	97.1	90.9	97.1	90.5	95.7	86.3	8506	97.1
2002	11512.2	1400	95.1	91.2	95.1	90.8	93.9	86.8	8350	95.3
2003	11671.6	1400	96.7	91.5	95.9	91.1	95.2	87.4	8491	96.9
2004	11595.3	1400	95.4	91.8	95.4	91.4	94.3	87.8	8395	95.6
2005	11102.6	1400	90.9	91.7	90.5	91.4	90.5	88.0	7976	91.1
2006	11755.3	1400	96.8	92.0	96.6	91.6	95.9	88.4	8494	97.0
2007	11377.5	1400	93.4	92.1	93.1	91.7	92.8	88.6	8200	93.6
2008	11456.2	1400	93.3	92.1	93.1	91.8	93.2	88.9	8217	93.5
2009	11484.9	1410	94.3	92.2	94.3	91.9	93.4	89.1	8277	94.5
2010	11375.3	1410	93.0	92.3	93.0	92.0	92.1	89.2	8162	93.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		94			66	
B. Refuelling without a maintenance				15		
C. Inspection, maintenance or repair combined with refuelling	504			476	9	
D. Inspection, maintenance or repair without refuelling				0		
E. Testing of plant systems or components				0	1	
L. Human factor related					11	
Z. Others					1	
Subtotal	504	94	0	491	88	0
Total		598			579	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
15. Reactor Cooling Systems	94	13
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System		0
41. Main Generator Systems		40
Total	94	64

DE-20 KRUEMMEL (KKK)

Operator: KKK (Kernkraftwerk Krümmel GmbH & Co. oHG)
Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1346.0 MW(e)
Design Net Capacity: 1260.0 MW(e)
Design Discharge Burnup: 27500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUf (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7
UCLF (%)	100.0	100.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 04 May 1974
Date of First Criticality: 14/09/1983
Date of Grid Connection: 28/09/1983
Date of Commercial Operation: 28/03/1984

Lifetime Generation: 201712.1 GW(e).h
Cumulative Energy Availability Factor: 69.5%
Cumulative Load Factor: 66.7%
Cumulative Unit Capability Factor: 69.8%
Cumulative Energy Unavailability Factor: 30.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1984	8569.0	1260	92.0	92.0	92.0	92.6	92.6	92.6	92.6	6984	95.1
1985	9301.9	1260	86.2	88.8	84.5	87.9	84.3	88.1	7551	86.2	
1986	9488.3	1260	87.0	88.2	87.0	87.6	86.0	87.3	7780	88.8	
1987	9180.2	1260	87.9	88.1	87.9	87.7	83.2	86.2	7822	89.3	
1988	9219.2	1260	90.1	88.5	90.1	88.2	83.3	85.6	8018	91.3	
1989	8241.6	1260	78.5	86.8	78.5	86.5	74.7	83.8	7247	82.7	
1990	8830.2	1260	84.5	86.5	84.5	86.2	80.0	83.2	7507	85.7	
1991	7737.6	1260	80.0	85.6	80.0	85.4	70.1	81.5	6946	79.3	
1992	8325.0	1260	83.2	85.4	83.2	85.2	75.2	80.8	7188	81.8	
1993	6558.5	1260	61.3	82.9	61.3	82.8	59.4	78.6	5399	61.6	
1994	2479.8	1260	25.1	77.6	25.1	77.4	22.5	73.5	2091	23.9	
1995	9217.9	1260	88.2	78.5	88.2	78.3	83.5	74.3	7824	89.3	
1996	8242.3	1260	83.9	78.9	83.9	78.8	74.5	74.3	6868	78.2	
1997	9250.6	1260	87.3	79.5	85.1	79.2	83.8	75.0	7492	85.5	
1998	4611.1	1260	46.1	77.3	44.0	76.9	41.8	72.8	3878	44.3	
1999	10517.1	1260	99.4	78.7	99.4	78.3	95.3	74.2	8760	100.0	
2000	9022.9	1260	90.2	79.3	90.2	79.0	81.5	74.6	7975	90.8	
2001	8141.9	1260	76.7	79.2	76.2	78.8	73.8	74.6	6591	75.2	
2002	8483.9	1260	78.0	79.1	78.0	78.8	76.9	74.7	7069	80.7	
2003	9488.5	1260	88.2	79.6	88.2	79.3	86.0	75.3	7809	89.1	
2004	9626.7	1260	87.7	80.0	87.7	79.7	87.0	75.8	7825	89.1	
2005	9243.4	1260	82.8	80.1	82.4	79.8	83.7	76.2	7328	83.7	
2006	10177.8	1260	90.6	80.6	88.6	80.2	92.2	76.9	7941	90.7	
2007	5454.9	1346	47.0	79.1	46.5	78.7	46.3	75.5	4151	47.4	
2008	0.0	1346	0.0	75.7	0.0	75.3	0.0	72.3	0	0.0	
2009	335.0	1346	2.9	72.7	2.9	72.3	2.8	69.4	353	4.0	
2010	0.0	1346	0.0	69.8	0.0	69.5	0.0	66.7	0	0.0	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		7297			1013	
C. Inspection, maintenance or repair combined with refuelling	1463			900	20	
D. Inspection, maintenance or repair without refuelling				24		
E. Testing of plant systems or components				7	1	
H. Nuclear regulatory requirements					157	14
J. Grid limitation, failure or grid unavailability						6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
L. Human factor related					0	
P. Fire					21	
Z. Others					16	
Subtotal	1463	7297	0	931	1228	20
Total		8760			2179	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		0
14. Safety Systems		1
15. Reactor Cooling Systems		1
21. Fuel Handling and Storage Facilities		19
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		697
41. Main Generator Systems		16
42. Electrical Power Supply Systems	7297	271
XX. Miscellaneous Systems		4
Total	7297	1009

DE-15 NECKARWESTHEIM-1 (GKN 1)

Operator: EnKK (EnBW Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 785.0 MW(e)
 Design Net Capacity: 805.0 MW(e)
 Design Discharge Burnup: 37500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1910.5 GW(e).h
 Energy Availability Factor: 62.2%
 Load Factor: 27.8%
 Operating Factor: 67.9%
 Energy Unavailability Factor: 37.8%
 Total Off-line Time: 2811 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	382.1	263.7	155.2	140.5	111.8	0.0	102.8	191.6	238.4	168.0	0.0	156.3	1910.5
EAF (%)	99.9	99.1	85.6	80.6	36.8	0.0	55.4	93.3	100.0	71.2	0.0	26.3	62.2
UCF (%)	99.9	99.1	85.6	80.6	36.8	0.0	55.4	93.3	100.0	71.2	0.0	26.3	62.2
LF (%)	65.4	50.0	26.6	24.9	19.1	0.0	17.6	32.8	42.2	28.7	0.0	26.8	27.8
OF (%)	100.0	100.0	100.0	100.0	45.6	0.0	70.7	100.0	100.0	71.5	0.0	28.0	67.9
EUF (%)	0.1	0.9	14.4	19.4	63.2	100.0	44.6	6.7	0.0	28.8	100.0	73.7	37.8
PUF (%)	0.0	0.0	0.0	0.0	54.4	100.0	31.0	0.0	0.0	28.8	100.0	73.7	32.4
UCLF (%)	0.1	0.9	14.4	19.4	8.8	0.0	13.7	6.7	0.0	0.0	0.0	0.0	5.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION ON REDUCED POWER FOR OPTIMIZATION OF CONDITIONING MODE IN THE CONTEXT OF RESOURCE SCHEDULING OF NUCLEAR POWER PLANT NEW OPERATING CYCLE: CYCLE NUMBER 38; FROM 2010-10-23 TO 2010-12-23

5. Historical Summary

Date of Construction Start: 02 Jan 1972
 Date of First Criticality: 26/05/1976
 Date of Grid Connection: 06 Mar 1976
 Date of Commercial Operation: 12 Jan 1976
 Lifetime Generation: 185447.6 GW(e).h
 Cumulative Energy Availability Factor: 82.7%
 Cumulative Load Factor: 77.6%
 Cumulative Unit Capability Factor: 82.8%
 Cumulative Energy Unavailability Factor: 17.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	508.6	788	89.3	89.3	89.3	89.3	86.4	86.4	658	88.4
1977	4946.6	810	70.6	72.0	70.6	72.0	69.7	71.0	6513	74.3
1978	4934.5	810	70.2	71.1	70.2	71.1	69.5	70.3	6583	75.1
1979	3573.0	810	53.6	65.5	53.6	65.5	50.4	63.8	4698	53.6
1980	5473.0	810	77.8	68.5	77.8	68.5	76.9	67.0	7080	80.6
1981	5949.3	810	84.9	71.7	84.9	71.7	83.8	70.3	7705	88.0
1982	5781.1	810	82.4	73.5	82.4	73.5	81.5	72.2	7517	85.8
1983	6047.0	810	85.3	75.1	85.3	75.1	85.2	74.0	7910	90.3
1984	5842.0	795	83.1	76.1	83.1	76.1	83.7	75.2	7618	86.7
1985	6161.4	795	88.8	77.5	88.8	77.5	88.5	76.6	8050	91.9
1986	4153.1	795	59.6	75.7	59.6	75.7	59.6	75.0	5368	61.3
1987	5395.1	795	76.8	75.8	76.8	75.8	77.5	75.2	6828	77.9
1988	5269.4	795	75.5	75.8	75.5	75.8	75.5	75.2	6772	77.1
1989	4019.5	795	64.2	74.9	64.2	74.9	57.7	73.9	6395	73.0
1990	5754.1	785	82.8	75.5	82.8	75.5	83.7	74.6	7524	85.9
1991	5404.5	785	85.0	76.1	85.0	76.1	78.6	74.8	7614	86.9
1992	5270.1	785	83.6	76.6	83.6	76.6	76.4	74.9	7470	85.0
1993	5559.5	785	81.6	76.8	81.6	76.8	80.8	75.3	7371	84.1
1994	6307.8	785	92.0	77.7	92.0	77.7	91.7	76.2	8184	93.4
1995	5966.0	785	87.4	78.2	87.4	78.2	86.8	76.7	8020	91.6
1996	6054.5	785	92.0	78.9	92.0	78.9	87.8	77.3	8301	94.5
1997	6230.2	785	92.6	79.5	92.6	79.5	90.6	77.9	8305	94.8
1998	5907.8	785	91.3	80.0	91.1	80.0	85.9	78.2	8185	93.4
1999	5849.1	785	90.0	80.4	90.0	80.4	85.1	78.5	8022	91.6
2000	6141.4	785	94.2	81.0	94.2	81.0	89.1	79.0	8284	94.3
2001	5991.5	785	90.0	81.4	88.1	81.3	87.1	79.3	8038	91.8
2002	6238.3	785	92.7	81.8	92.7	81.7	90.7	79.7	8239	94.1
2003	6024.0	785	90.5	82.1	90.5	82.0	87.6	80.0	8304	94.8
2004	5928.5	785	89.7	82.4	89.7	82.3	86.0	80.2	8270	94.1
2005	5882.7	785	86.9	82.5	86.9	82.5	85.5	80.4	8069	92.1
2006	6182.2	785	93.5	82.9	93.1	82.8	89.9	80.7	8250	94.2
2007	4713.5	785	92.4	83.2	92.2	83.1	68.5	80.3	8153	93.1
2008	3787.0	785	78.1	83.0	77.5	82.9	54.9	79.5	6990	79.6
2009	4362.0	785	94.6	83.4	94.6	83.3	63.4	79.1	8317	94.9
2010	1910.5	785	62.2	82.8	62.2	82.7	27.8	77.6	5949	67.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					43	
C. Inspection, maintenance or repair combined with refuelling	2811			1052		
D. Inspection, maintenance or repair without refuelling				19		
E. Testing of plant systems or components					44	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						1
L. Human factor related					1	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)				5		
Subtotal	2811	0	0	1076	88	1
Total		2811			1165	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1976 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		10
14. Safety Systems		1
15. Reactor Cooling Systems		17
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System		6
41. Main Generator Systems		3
42. Electrical Power Supply Systems		0
Total	0	41

DE-44 NECKARWESTHEIM-2 (GKN 2)

Operator: EnKK (EnBW Kernkraft GmbH)
Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1310.0 MW(e)
Design Net Capacity: 1225.0 MW(e)
Design Discharge Burnup: 46000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10180.1 GW(e).h
Energy Availability Factor: 88.6%
Load Factor: 88.7%
Operating Factor: 89.8%
Energy Unavailability Factor: 11.4%
Total Off-line Time: 896 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	974.5	884.6	977.3	942.8	969.2	928.1	954.6	952.0	695.3	0.0	917.7	984.1	10180.1
EAF (%)	98.9	99.7	99.9	99.9	100.0	98.4	97.9	97.7	74.6	0.0	98.3	99.8	88.6
UCF (%)	98.9	100.0	100.0	100.0	100.0	100.0	100.0	99.7	78.8	0.0	98.3	100.0	89.5
LF (%)	100.0	100.5	100.4	100.0	99.4	98.4	97.9	97.7	73.7	0.0	97.3	101.0	88.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.7	0.0	98.3	100.0	89.8
EUAF (%)	1.1	0.3	0.1	0.1	0.0	1.6	2.1	2.3	25.4	100.0	1.7	0.2	11.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.2	65.0	0.0	0.0	7.3
UCLF (%)	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	35.0	1.7	0.0	3.2
XUF (%)	0.0	0.2	0.1	0.1	0.0	1.6	2.0	2.0	4.2	0.0	0.0	0.2	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Sep 1982
Date of First Criticality: 29/12/1988
Date of Grid Connection: 01 Mar 1989
Date of Commercial Operation: 15/04/1989

Lifetime Generation: 226177.5 GW(e).h
Cumulative Energy Availability Factor: 93.3%
Cumulative Load Factor: 92.3%
Cumulative Unit Capability Factor: 93.4%
Cumulative Energy Unavailability Factor: 6.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	6810.0	1225	99.8	99.8	99.8	99.8	84.2	84.2	6254	94.7
1990	9693.9	1225	90.2	94.3	90.2	94.3	90.3	87.7	7958	90.8
1991	9434.9	1225	90.5	92.9	90.5	92.9	87.9	87.8	7932	90.5
1992	10204.6	1269	91.6	92.6	91.6	92.6	91.5	88.8	8094	92.1
1993	9912.2	1269	89.0	91.8	89.0	91.8	89.2	88.9	8163	93.2
1994	10320.7	1269	93.6	92.1	93.6	92.1	92.8	89.6	8215	93.8
1995	10532.0	1269	94.7	92.5	94.7	92.5	94.7	90.4	8351	95.3
1996	10614.3	1269	95.1	92.8	95.1	92.8	95.2	91.0	8419	95.8
1997	10111.6	1269	91.5	92.7	91.5	92.7	91.0	91.0	8028	91.6
1998	10610.8	1269	96.0	93.0	96.0	93.0	95.5	91.5	8411	96.0
1999	10460.9	1269	96.1	93.3	96.1	93.3	94.1	91.7	8435	96.3
2000	10473.9	1269	96.2	93.6	96.2	93.6	94.0	91.9	8450	96.2
2001	10423.9	1269	95.4	93.7	94.2	93.6	93.8	92.0	8363	95.5
2002	9787.5	1269	88.7	93.3	88.7	93.3	88.0	91.8	7777	88.8
2003	10545.0	1269	95.8	93.5	95.8	93.4	94.9	92.0	8408	96.0
2004	10470.7	1269	92.9	93.5	92.9	93.4	93.9	92.1	8165	93.0
2005	10836.4	1305	95.4	93.6	94.8	93.5	94.8	92.3	8371	95.6
2006	10877.5	1305	95.9	93.7	95.4	93.6	95.2	92.4	8405	95.9
2007	10411.1	1310	91.1	93.6	91.1	93.5	90.7	92.3	8002	91.3
2008	10701.9	1310	93.5	93.6	93.3	93.4	93.0	92.4	8245	93.9
2009	10779.7	1310	94.7	93.6	94.6	93.5	93.9	92.4	8307	94.8
2010	10180.1	1310	89.5	93.4	88.6	93.3	88.7	92.3	7864	89.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					12	
C. Inspection, maintenance or repair combined with refuelling	624			471		
L. Human factor related		272			7	
Subtotal	624	272	0	471	19	0
Total		896			490	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		11
32. Feedwater and Main Steam System		0
41. Main Generator Systems		0
Total	0	11

DE-14 PHILIPPSBURG-1 (KKP 1)

Operator: EnKK (EnBW Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 890.0 MW(e)
 Design Net Capacity: 864.0 MW(e)
 Design Discharge Burnup: 17900 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6488.7 GW(e).h
 Energy Availability Factor: 83.4%
 Load Factor: 83.2%
 Operating Factor: 86.8%
 Energy Unavailability Factor: 16.6%
 Total Off-line Time: 1153 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	660.3	583.3	600.6	161.0	332.9	627.8	634.8	637.6	631.6	347.0	617.6	654.1	6488.7
EAF (%)	99.7	98.1	91.4	25.4	50.3	98.2	95.9	96.3	98.5	52.3	96.6	99.1	83.4
UCF (%)	99.9	100.0	99.8	30.0	51.3	100.0	100.0	99.4	100.0	53.4	98.3	100.0	85.9
LF (%)	99.7	97.5	90.8	25.1	50.3	98.0	95.9	96.3	98.6	52.3	96.4	98.8	83.2
OF (%)	100.0	100.0	100.0	30.6	56.2	100.0	100.0	100.0	100.0	56.1	100.0	100.0	86.8
EUf (%)	0.3	1.9	8.6	74.6	49.7	1.8	4.1	3.7	1.5	47.7	3.4	0.9	16.6
PUf (%)	0.0	0.0	0.2	70.0	48.6	0.0	0.0	0.6	0.0	46.6	0.0	0.0	13.9
UCLF (%)	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.2
XUF (%)	0.2	1.9	8.4	4.5	1.0	1.8	4.1	3.1	1.5	1.1	1.7	0.9	2.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1970
 Date of First Criticality: 03 Sep 1979
 Date of Grid Connection: 05 May 1979
 Date of Commercial Operation: 26/03/1980

Lifetime Generation: 186136.7 GW(e).h
 Cumulative Energy Availability Factor: 79.8%
 Cumulative Load Factor: 77.6%
 Cumulative Unit Capability Factor: 80.1%
 Cumulative Energy Unavailability Factor: 20.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	1205.0	864	19.2	19.2	19.2	19.2	19.0	19.0	1562	21.3
1981	1090.9	864	16.6	17.8	16.6	17.8	14.4	16.5	1465	16.7
1982	5034.4	840	66.5	34.6	66.5	34.6	68.4	34.5	6237	71.2
1983	5503.0	864	72.7	44.6	72.7	44.6	72.7	44.5	6567	75.0
1984	6325.0	864	83.2	52.7	83.2	52.7	83.3	52.6	7482	85.2
1985	6120.2	864	81.1	57.6	81.1	57.6	80.9	57.5	7561	86.3
1986	5222.0	864	69.1	59.3	69.1	59.3	69.0	59.1	6148	70.2
1987	6488.4	864	84.9	62.5	84.9	62.5	85.7	62.5	7582	86.6
1988	6199.6	864	83.7	64.9	83.7	64.9	81.7	64.7	7302	83.1
1989	6158.9	864	81.4	66.6	81.4	66.6	81.4	66.4	7432	84.8
1990	5203.1	864	68.3	66.8	68.3	66.8	68.7	66.6	6138	70.1
1991	6171.9	864	82.9	68.1	82.9	68.1	81.5	67.9	7304	83.4
1992	6513.0	864	86.6	69.6	86.6	69.6	85.8	69.3	7647	87.1
1993	4614.5	864	74.7	69.9	74.7	69.9	61.0	68.7	6599	75.3
1994	6565.9	864	86.5	71.1	86.5	71.1	86.8	69.9	7645	87.3
1995	6317.1	876	86.9	72.1	86.9	72.1	82.3	70.7	7671	87.6
1996	6929.8	864	91.1	73.2	91.1	73.2	91.3	71.9	8087	92.1
1997	6409.5	876	85.3	73.9	85.3	73.9	83.5	72.6	7510	85.7
1998	6905.9	890	93.9	75.0	93.9	75.0	88.6	73.5	8253	94.2
1999	6892.9	890	94.3	76.0	94.3	76.0	88.4	74.2	8292	94.7
2000	6904.9	890	92.9	76.8	92.9	76.8	88.3	74.9	8187	93.2
2001	6956.9	890	92.7	77.6	92.7	77.6	89.2	75.6	8206	93.7
2002	6559.4	890	89.4	78.1	89.4	78.1	84.1	76.0	7885	90.0
2003	6395.2	890	86.0	78.4	86.0	78.4	82.0	76.2	7629	87.1
2004	6332.0	890	83.5	78.6	83.5	78.6	81.0	76.4	7425	84.5
2005	5811.8	890	77.5	78.6	75.8	78.5	74.5	76.4	6835	78.0
2006	6888.8	890	90.3	79.0	90.3	79.0	88.4	76.8	7983	91.1
2007	6944.9	890	92.0	79.5	90.0	79.4	89.1	77.3	8124	92.7
2008	6126.6	890	82.5	79.6	80.2	79.4	78.4	77.3	7318	83.3
2009	6149.8	890	87.2	79.9	87.2	79.7	78.9	77.4	7687	87.8
2010	6488.7	890	85.9	80.1	83.4	79.8	83.2	77.6	7607	86.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					147	
B. Refuelling without a maintenance	327				0	
C. Inspection, maintenance or repair combined with refuelling	826			986	2	
D. Inspection, maintenance or repair without refuelling				17		
E. Testing of plant systems or components					5	
H. Nuclear regulatory requirements					9	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
Z. Others					5	
Subtotal	1153	0	0	1003	173	0
Total		1153			1176	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		2
14. Safety Systems		13
15. Reactor Cooling Systems		42
16. Steam generation systems		3
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		22
33. Circulating Water System		1
41. Main Generator Systems		10
42. Electrical Power Supply Systems		0
XX. Miscellaneous Systems		13
Total	0	134

DE-24 PHILIPPSBURG-2 (KKP 2)

Operator: EnKK (EnBW Kernkraft GmbH)
 Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1402.0 MW(e)
 Design Net Capacity: 1268.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11192.1 GW(e).h
 Energy Availability Factor: 91.6%
 Load Factor: 91.1%
 Operating Factor: 93.0%
 Energy Unavailability Factor: 8.4%
 Total Off-line Time: 614 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1030.5	933.0	1028.5	993.9	1010.5	128.7	1000.9	1012.6	992.8	1031.6	994.6	1034.4	11192.1
EAF (%)	98.8	99.2	98.7	99.1	96.9	12.8	96.7	98.6	99.3	99.7	98.9	99.3	91.6
UCF (%)	100.0	100.0	99.9	100.0	99.9	13.8	99.5	100.0	100.0	100.0	100.0	100.0	92.8
LF (%)	98.8	99.0	98.7	98.5	96.9	12.8	96.0	97.1	98.4	98.8	98.5	99.2	91.1
OF (%)	100.0	100.0	100.0	100.0	100.0	14.7	100.0	100.0	100.0	100.0	100.0	100.0	93.0
EUf (%)	1.2	0.8	1.3	0.9	3.1	87.2	3.3	1.4	0.7	0.3	1.1	0.7	8.4
PUF (%)	0.0	0.0	0.1	0.0	0.0	86.2	0.5	0.0	0.0	0.0	0.0	0.0	7.1
UCLF (%)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	1.2	0.8	1.2	0.9	3.0	1.0	2.8	1.4	0.6	0.3	1.1	0.7	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jul 1977
 Date of First Criticality: 13/12/1984
 Date of Grid Connection: 17/12/1984
 Date of Commercial Operation: 18/04/1985

Lifetime Generation: 269752.9 GW(e).h
 Cumulative Energy Availability Factor: 89.4%
 Cumulative Load Factor: 88.6%
 Cumulative Unit Capability Factor: 90.6%
 Cumulative Energy Unavailability Factor: 10.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	7930.0	1268	95.0	95.0	95.0	95.0	94.7	94.7	6411	97.1
1986	10235.3	1268	90.6	92.5	90.6	92.5	92.1	93.3	7958	90.8
1987	9616.2	1268	85.0	89.8	85.0	89.8	86.6	90.8	7446	85.0
1988	9710.8	1268	86.5	88.9	86.5	88.9	87.2	89.9	7656	87.2
1989	9677.3	1268	86.2	88.3	86.2	88.3	87.1	89.3	7575	86.5
1990	8516.3	1268	75.5	86.1	75.5	86.1	76.7	87.1	6628	75.7
1991	9903.3	1268	88.4	86.4	88.0	86.4	89.1	87.4	7757	88.6
1992	9400.0	1285	82.2	85.9	82.2	85.8	83.3	86.9	7273	82.8
1993	10481.3	1324	90.5	86.4	90.5	86.4	90.4	87.3	7946	90.7
1994	10284.8	1336	88.7	86.7	88.7	86.6	87.9	87.3	7778	88.8
1995	10550.5	1336	91.0	87.1	91.0	87.0	90.1	87.6	7990	91.2
1996	11217.6	1358	94.7	87.8	94.7	87.7	94.0	88.2	8323	94.8
1997	11113.5	1358	95.3	88.4	95.3	88.4	93.4	88.6	8358	95.4
1998	10731.5	1358	93.0	88.7	93.0	88.7	90.2	88.7	8304	94.8
1999	11122.9	1358	96.1	89.3	96.1	89.2	93.5	89.1	8431	96.2
2000	10689.1	1363	92.2	89.5	92.2	89.4	89.2	89.1	8115	92.4
2001	8995.8	1392	96.0	89.9	76.6	88.6	73.8	88.1	6749	77.0
2002	11053.2	1392	92.4	90.0	92.4	88.8	90.6	88.3	8138	92.9
2003	11010.2	1392	93.5	90.2	93.5	89.1	90.3	88.4	8234	94.0
2004	10295.0	1392	86.9	90.0	86.9	89.0	84.2	88.2	7641	87.0
2005	10823.4	1392	92.3	90.2	89.3	89.0	88.8	88.2	8099	92.5
2006	10956.2	1392	92.8	90.3	91.2	89.1	89.8	88.3	8138	92.9
2007	11172.9	1392	94.1	90.5	92.1	89.2	91.6	88.4	8254	94.2
2008	10840.8	1392	90.3	90.4	88.7	89.2	88.7	88.4	7953	90.5
2009	10969.6	1392	92.3	90.5	92.3	89.3	90.0	88.5	8104	92.5
2010	11192.1	1402	92.8	90.6	91.6	89.4	91.1	88.6	8146	93.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					74	
C. Inspection, maintenance or repair combined with refuelling	614			645	5	
D. Inspection, maintenance or repair without refuelling				45		
E. Testing of plant systems or components				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						64
Z. Others					16	
Subtotal	614	0	0	690	95	64
Total		614			849	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		4
15. Reactor Cooling Systems		48
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		0
41. Main Generator Systems		11
42. Electrical Power Supply Systems		7
Total	0	70

DE-17 UNTERWESER (KKU)

Operator: E.ON (E.ON Kernkraft GmbH)
Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1345.0 MW(e)
Design Net Capacity: 1230.0 MW(e)
Design Discharge Burnup: 35400 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10698.9 GW(e).h
Energy Availability Factor: 91.0%
Load Factor: 90.8%
Operating Factor: 93.4%
Energy Unavailability Factor: 9.0%
Total Off-line Time: 581 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	979.0	915.8	1008.9	970.5	991.8	931.7	792.1	229.7	968.5	997.6	960.8	952.4	10698.9
EAF (%)	96.9	100.0	100.0	100.0	100.0	99.7	79.8	23.2	99.9	100.0	100.0	95.3	91.0
UCF (%)	96.9	100.0	100.0	100.0	100.0	100.0	100.0	24.6	99.9	100.0	100.0	95.3	92.9
LF (%)	97.8	101.3	101.0	100.2	99.1	96.2	79.2	23.0	100.0	99.6	99.2	95.2	90.8
OF (%)	97.0	100.0	100.0	100.0	100.0	100.0	100.0	28.4	100.0	100.0	100.0	96.5	93.4
EUf (%)	3.1	0.0	0.0	0.0	0.0	0.3	20.2	76.8	0.1	0.0	0.0	4.7	9.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.3	0.1	0.0	0.0	0.0	5.0
UCLF (%)	3.1	0.0	0.0	0.0	0.0	0.0	0.0	17.1	0.0	0.0	0.0	4.7	2.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.2	20.2	1.4	0.0	0.0	0.0	0.0	1.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jan 1972 **Lifetime Generation:** 287378.6 GW(e).h
Date of First Criticality: 16/09/1978 **Cumulative Energy Availability Factor:** 82.4%
Date of Grid Connection: 29/09/1978 **Cumulative Load Factor:** 80.3%
Date of Commercial Operation: 09 Jun 1979 **Cumulative Unit Capability Factor:** 83.1%
Cumulative Energy Unavailability Factor: 17.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	3338.0	1230	92.1	92.1	92.1	92.1	92.7	92.7	2731	93.3
1980	9272.0	1230	85.8	87.3	85.8	87.3	85.8	87.5	7832	89.2
1981	9023.5	1230	83.5	85.7	83.5	85.7	83.7	85.9	7606	86.8
1982	9114.2	1230	84.7	85.4	84.7	85.4	84.6	85.5	8022	91.6
1983	8215.0	1230	75.8	83.2	75.8	83.2	76.2	83.4	7191	82.1
1984	9483.0	1230	87.2	83.9	87.2	83.9	87.8	84.2	7908	90.0
1985	9931.8	1230	93.4	85.4	93.4	85.4	92.2	85.5	8279	94.5
1986	7280.8	1230	67.4	83.0	67.4	83.0	67.6	83.0	6254	71.4
1987	8673.9	1230	80.7	82.7	80.7	82.7	80.5	82.7	7277	83.1
1988	9108.4	1230	84.9	82.9	84.9	82.9	84.3	82.9	7627	86.8
1989	9245.6	1230	89.3	83.6	89.3	83.6	85.8	83.2	7873	89.9
1990	8485.0	1230	78.9	83.2	78.9	83.2	78.7	82.8	6921	79.0
1991	6485.9	1231	61.1	81.4	61.1	81.4	60.1	80.9	5369	61.3
1992	8731.5	1230	86.5	81.7	86.5	81.7	80.8	80.9	7646	87.0
1993	10824.8	1255	99.9	83.0	99.9	83.0	98.5	82.2	8760	100.0
1994	7685.9	1255	80.1	82.8	80.1	82.8	69.9	81.4	7039	80.4
1995	7980.6	1255	77.5	82.5	77.5	82.5	72.6	80.8	6832	78.0
1996	9907.7	1285	91.3	83.0	91.3	83.0	87.8	81.2	8055	91.7
1997	9932.4	1285	94.4	83.7	94.4	83.7	88.2	81.6	8291	94.6
1998	6618.0	1285	58.7	82.3	58.7	82.3	58.8	80.4	5217	59.6
1999	8096.6	1285	78.3	82.1	78.3	82.1	71.9	80.0	6899	78.8
2000	9615.8	1295	86.2	82.3	86.2	82.3	84.5	80.2	7604	86.6
2001	10656.7	1345	95.2	83.0	90.8	82.7	90.4	80.7	8378	95.6
2002	6774.8	1345	60.5	81.9	60.5	81.7	57.5	79.6	5313	60.7
2003	9254.9	1345	88.3	82.2	88.3	82.0	78.5	79.6	7882	90.0
2004	9724.0	1345	87.4	82.4	87.4	82.2	82.3	79.7	7711	87.8
2005	8890.6	1345	76.7	82.2	75.9	82.0	75.5	79.5	6742	77.0
2006	10391.5	1345	94.7	82.7	88.6	82.2	88.2	79.9	8315	94.9
2007	9076.3	1345	79.3	82.6	77.3	82.1	77.0	79.8	6984	79.7
2008	9295.5	1345	82.8	82.6	79.5	82.0	78.7	79.7	7663	87.2
2009	10028.9	1345	89.5	82.8	85.1	82.1	85.1	79.9	7868	89.8
2010	10698.9	1345	92.9	83.1	91.0	82.4	90.8	80.3	8179	93.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		55			273	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	425			856	82	
D. Inspection, maintenance or repair without refuelling				27		
E. Testing of plant systems or components				27		
H. Nuclear regulatory requirements				0	24	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					16	
L. Human factor related		101			12	
Subtotal	425	156	0	910	418	0
Total		581			1328	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	9	30
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		22
15. Reactor Cooling Systems		13
31. Turbine and auxiliaries	7	51
32. Feedwater and Main Steam System	39	9
33. Circulating Water System		0
41. Main Generator Systems		125
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		0
Total	55	268

HU-1 PAKS-1

Operator: PAKS Zrt (PAKS NUCLEAR POWER PLANT LTD)
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 470.0 MW(e)
Design Net Capacity: 408.0 MW(e)
Design Discharge Burnup: 37000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3762.0 GW(e).h
Energy Availability Factor: 91.5%
Load Factor: 91.4%
Operating Factor: 91.7%
Energy Unavailability Factor: 8.5%
Total Off-line Time: 729 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	346.9	315.8	284.8	51.3	349.7	338.4	349.7	349.7	338.4	349.5	338.4	349.6	3762.0
EAF (%)	100.0	100.0	81.6	15.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
UCF (%)	100.0	100.0	81.6	15.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
LF (%)	99.2	100.0	81.5	15.2	100.0	100.0	100.0	100.0	100.0	99.8	100.0	100.0	91.4
OF (%)	100.0	100.0	82.0	17.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.7
EUf (%)	0.0	0.0	18.4	84.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
PUf (%)	0.0	0.0	18.4	76.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9
UCLF (%)	0.0	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE LOAD MODE

5. Historical Summary

Date of Construction Start: 08 Jan 1974
Date of First Criticality: 14/12/1982
Date of Grid Connection: 28/12/1982
Date of Commercial Operation: 08 Oct 1983

Lifetime Generation: 90708.0 GW(e).h
Cumulative Energy Availability Factor: 86.0%
Cumulative Load Factor: 86.8%
Cumulative Unit Capability Factor: 86.1%
Cumulative Energy Unavailability Factor: 14.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	1370.0	410	91.0	91.0	91.0	91.0	91.0	91.0	3662	99.7
1984	2595.3	403	75.7	80.3	75.6	80.2	73.3	78.5	6901	78.6
1985	2997.3	410	84.2	81.9	84.2	81.9	83.5	80.6	7491	85.5
1986	3114.6	410	87.1	83.4	87.1	83.4	86.7	82.4	7718	88.1
1987	2883.1	415	79.2	82.5	79.2	82.4	79.3	81.7	7107	81.1
1988	3076.9	415	85.8	83.1	85.8	83.1	84.4	82.2	7737	88.1
1989	3182.2	415	87.7	83.8	87.7	83.8	87.5	83.0	7929	90.5
1990	3216.8	415	87.2	84.3	87.2	84.3	88.5	83.8	7837	89.5
1991	2883.9	410	75.1	83.2	75.1	83.2	80.3	83.4	6823	77.9
1992	3498.9	430	84.9	83.4	84.9	83.4	92.6	84.4	7629	86.9
1993	3512.4	430	85.8	83.6	85.8	83.6	93.2	85.3	7637	87.2
1994	3441.5	430	89.9	84.2	89.8	84.2	91.4	85.8	8031	91.7
1995	3056.3	430	79.6	83.8	79.5	83.8	81.1	85.4	7088	80.9
1996	3472.7	430	90.7	84.3	90.6	84.3	91.9	85.9	8033	91.5
1997	3328.5	430	87.0	84.5	86.9	84.5	88.4	86.1	7646	87.3
1998	3487.7	430	92.4	85.1	92.4	85.0	92.6	86.5	8095	92.4
1999	3117.5	430	81.6	84.8	81.2	84.8	82.8	86.3	7240	82.6
2000	3192.1	430	82.5	84.7	82.3	84.6	84.5	86.2	7268	82.7
2001	3514.9	437	91.8	85.1	91.6	85.0	91.8	86.5	8069	92.1
2002	3330.7	437	90.2	85.4	90.1	85.3	87.0	86.5	7909	90.3
2003	3097.8	437	81.0	85.1	81.0	85.1	80.9	86.3	7197	82.1
2004	3342.3	437	87.1	85.2	87.1	85.2	87.1	86.3	7692	87.6
2005	3503.5	437	91.5	85.5	91.5	85.5	91.5	86.5	8029	91.7
2006	3468.5	437	90.8	85.8	90.8	85.7	90.6	86.7	7979	91.1
2007	3179.4	470	79.7	85.5	79.7	85.4	79.7	86.4	6933	79.1
2008	3670.3	470	88.9	85.6	88.9	85.6	88.9	86.5	7824	89.1
2009	3708.0	470	90.2	85.8	90.2	85.8	90.1	86.7	7926	90.5
2010	3762.0	470	91.5	86.1	91.5	86.0	91.4	86.8	8031	91.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		58			88	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	689			947	24	
D. Inspection, maintenance or repair without refuelling				16		
E. Testing of plant systems or components					0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	
Z. Others					7	
Subtotal	689	58	0	963	126	0
Total		747			1089	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems		6
14. Safety Systems		3
15. Reactor Cooling Systems		1
16. Steam generation systems		12
17. Safety I&C Systems (excluding reactor I&C)	58	
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System		10
33. Circulating Water System		9
35. All other I&C Systems		0
41. Main Generator Systems		0
42. Electrical Power Supply Systems		4
Total	58	69

HU-2 PAKS-2

Operator: PAKS Zrt (PAKS NUCLEAR POWER PLANT LTD)
 Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 473.0 MW(e)
 Design Net Capacity: 410.0 MW(e)
 Design Discharge Burnup: 37000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3715.8 GW(e).h
 Energy Availability Factor: 89.7%
 Load Factor: 89.7%
 Operating Factor: 90.1%
 Energy Unavailability Factor: 10.3%
 Total Off-line Time: 868 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	349.9	317.4	277.6	340.5	351.9	340.6	11.3	341.8	340.5	351.8	340.6	351.9	3715.8
EAF (%)	100.0	99.9	79.0	100.0	100.0	100.0	3.2	97.1	100.0	100.0	100.0	100.0	89.7
UCF (%)	100.0	99.9	79.0	100.0	100.0	100.0	3.2	97.1	100.0	100.0	100.0	100.0	89.7
LF (%)	99.4	99.9	79.0	100.0	100.0	100.0	3.2	97.1	100.0	99.8	100.0	100.0	89.7
OF (%)	100.0	100.0	80.3	100.0	100.0	100.0	3.6	99.3	100.0	100.0	100.0	100.0	90.1
EUf (%)	0.0	0.1	21.0	0.0	0.0	0.0	96.8	2.9	0.0	0.0	0.0	0.0	10.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	93.6	0.0	0.0	0.0	0.0	0.0	7.9
UCLF (%)	0.0	0.1	21.0	0.0	0.0	0.0	3.2	2.9	0.0	0.0	0.0	0.0	2.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE LOAD MODE

5. Historical Summary

Date of Construction Start: 08 Jan 1974
 Date of First Criticality: 26/08/1984
 Date of Grid Connection: 09 Jun 1984
 Date of Commercial Operation: 14/11/1984

Lifetime Generation: 80496.0 GW(e).h
 Cumulative Energy Availability Factor: 79.9%
 Cumulative Load Factor: 80.7%
 Cumulative Unit Capability Factor: 80.0%
 Cumulative Energy Unavailability Factor: 20.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	584.2	425	94.1	94.1	94.1	94.1	97.3	97.3	1456	99.5
1985	3101.6	415	85.1	86.4	85.1	86.4	85.3	87.0	7695	87.8
1986	3148.3	415	86.0	86.2	86.0	86.2	86.6	86.8	7643	87.2
1987	3193.9	415	85.3	85.9	85.3	85.9	87.9	87.2	7770	88.7
1988	3046.3	415	81.9	85.0	81.9	85.0	83.6	86.3	7352	83.7
1989	3300.7	415	88.6	85.7	88.6	85.7	90.8	87.2	7962	90.9
1990	3338.2	425	88.0	86.1	88.0	86.1	89.7	87.6	7845	89.6
1991	3421.6	415	88.6	86.4	88.6	86.4	94.1	88.5	7912	90.3
1992	3174.9	433	76.0	85.1	76.0	85.1	83.5	87.8	6829	77.7
1993	3569.0	433	87.0	85.3	87.0	85.3	94.1	88.6	7731	88.3
1994	3440.4	433	89.5	85.7	89.4	85.7	90.7	88.8	8000	91.3
1995	3309.1	433	86.6	85.8	86.4	85.8	87.2	88.6	7657	87.4
1996	3019.9	433	79.5	85.3	79.4	85.3	79.4	87.8	7011	79.8
1997	3267.6	433	88.3	85.5	88.2	85.5	86.1	87.7	7807	89.1
1998	3206.7	433	88.3	85.7	88.2	85.7	84.5	87.5	7717	88.1
1999	3246.6	433	90.2	86.0	89.2	85.9	85.6	87.4	7780	88.8
2000	3059.3	433	80.1	85.6	80.0	85.5	80.4	86.9	7073	80.5
2001	3266.9	441	84.9	85.6	84.8	85.5	84.6	86.8	7484	85.4
2002	3338.5	441	86.7	85.7	86.5	85.6	86.4	86.8	7644	87.3
2003	918.8	441	23.8	82.3	23.8	82.2	23.8	83.4	2089	23.8
2004	1137.2	441	29.4	79.6	29.4	79.5	29.4	80.6	2620	29.8
2005	2929.5	441	75.8	79.4	75.8	79.4	75.8	80.4	6669	76.1
2006	2399.6	441	62.6	78.7	62.3	78.6	62.1	79.5	5493	62.7
2007	3477.0	443	89.2	79.1	89.2	79.0	89.6	80.0	7887	90.0
2008	2993.8	473	76.3	79.0	76.2	78.9	76.5	79.8	6669	75.9
2009	3772.5	473	91.1	79.5	91.1	79.4	91.0	80.3	7985	91.2
2010	3715.8	473	89.7	80.0	89.7	79.9	89.7	80.7	7892	90.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		198			508	
B. Refuelling without a maintenance					14	
C. Inspection, maintenance or repair combined with refuelling	696			925	16	
D. Inspection, maintenance or repair without refuelling				93		
E. Testing of plant systems or components				1	0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					19	
L. Human factor related					7	
Z. Others					5	
Subtotal	696	198	0	1019	569	0
Total		894			1588	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		24
15. Reactor Cooling Systems	155	3
16. Steam generation systems		12
17. Safety I&C Systems (excluding reactor I&C)		18
21. Fuel Handling and Storage Facilities		427
31. Turbine and auxiliaries	42	15
32. Feedwater and Main Steam System		0
41. Main Generator Systems		0
42. Electrical Power Supply Systems		2
Total	197	501

HU-3 PAKS-3

Operator: PAKS Zrt (PAKS NUCLEAR POWER PLANT LTD)
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 473.0 MW(e)
Design Net Capacity: 410.0 MW(e)
Design Discharge Burnup: 37000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3831.5 GW(e).h
Energy Availability Factor: 92.5%
Load Factor: 92.5%
Operating Factor: 92.7%
Energy Unavailability Factor: 7.5%
Total Off-line Time: 637 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	351.9	316.4	351.3	340.3	351.9	340.6	351.9	351.9	272.4	110.4	340.6	351.9	3831.5
EAF (%)	100.0	99.5	100.0	100.0	100.0	100.0	100.0	100.0	80.0	31.3	100.0	100.0	92.5
UCF (%)	100.0	99.5	100.0	100.0	100.0	100.0	100.0	100.0	80.0	31.3	100.0	100.0	92.5
LF (%)	100.0	99.5	100.0	99.9	100.0	100.0	100.0	100.0	80.0	31.3	100.0	100.0	92.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.4	33.4	100.0	100.0	92.7
EUf (%)	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	20.0	68.7	0.0	0.0	7.5
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	68.7	0.0	0.0	7.5
UCLF (%)	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE LOAD MODE

5. Historical Summary

Date of Construction Start: 10 Jan 1979
Date of First Criticality: 15/09/1986
Date of Grid Connection: 28/09/1986
Date of Commercial Operation: 12 Jan 1986

Lifetime Generation: 79943.0 GW(e).h
Cumulative Energy Availability Factor: 86.6%
Cumulative Load Factor: 87.4%
Cumulative Unit Capability Factor: 87.0%
Cumulative Energy Unavailability Factor: 13.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	314.1	427	99.6	99.6	99.6	99.6	101.7	101.7	744	100.0
1987	3209.6	415	87.0	87.9	87.0	87.9	88.3	89.3	7648	87.3
1988	3300.9	415	88.1	88.0	88.1	88.0	90.6	89.9	7874	89.6
1989	3140.5	415	82.4	86.2	82.4	86.2	86.4	88.8	7343	83.8
1990	3273.4	435	85.6	86.1	85.6	86.1	85.9	88.0	7755	88.5
1991	3256.0	410	84.2	85.7	84.2	85.7	90.7	88.6	7580	86.5
1992	3587.3	433	87.7	86.0	87.5	86.0	94.3	89.5	7852	89.4
1993	3177.9	433	77.6	84.8	77.4	84.8	83.8	88.7	6950	79.3
1994	3376.0	433	88.6	85.3	88.5	85.2	89.0	88.7	7884	90.0
1995	3392.8	433	89.2	85.7	89.0	85.7	89.4	88.8	7911	90.3
1996	3429.4	433	90.9	86.3	90.8	86.2	90.2	89.0	8136	92.6
1997	3066.1	433	81.1	85.8	80.9	85.7	80.8	88.2	7136	81.5
1998	3294.1	433	88.0	86.0	88.0	85.9	86.8	88.1	7566	86.4
1999	3445.7	433	92.3	86.5	92.2	86.4	90.8	88.3	8058	92.0
2000	3517.3	433	93.0	86.9	92.8	86.8	92.5	88.6	8163	92.9
2001	3040.4	433	80.7	86.5	80.3	86.4	80.2	88.0	7159	81.7
2002	3256.8	433	90.5	86.8	90.4	86.6	85.9	87.9	7900	90.2
2003	3008.3	433	87.8	86.8	80.5	86.3	79.3	87.4	7746	88.4
2004	3333.3	433	87.6	86.9	87.6	86.4	87.6	87.4	7732	88.0
2005	3038.7	433	80.1	86.5	80.1	86.0	80.1	87.0	7088	80.9
2006	3454.9	433	91.2	86.8	91.2	86.3	91.1	87.2	8007	91.4
2007	3396.0	443	87.5	86.8	87.5	86.3	87.5	87.2	7691	87.8
2008	3530.4	443	90.7	87.0	90.6	86.5	90.7	87.4	7962	90.6
2009	3174.0	473	80.9	86.7	80.9	86.3	80.9	87.1	7078	80.8
2010	3831.5	473	92.5	87.0	92.5	86.6	92.5	87.4	8123	92.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					123	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	655			889	111	
D. Inspection, maintenance or repair without refuelling				21		
E. Testing of plant systems or components				1	5	
Z. Others					10	
Subtotal	655	0	0	911	249	0
Total		655			1160	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		13
12. Reactor I&C Systems		39
14. Safety Systems		0
15. Reactor Cooling Systems		0
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		19
42. Electrical Power Supply Systems		32
Total	0	111

HU-4 PAKS-4

Operator: PAKS Zrt (PAKS NUCLEAR POWER PLANT LTD)
Contractor: AEE (ATOMENERGOEXPORT)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 473.0 MW(e)
Design Net Capacity: 410.0 MW(e)
Design Discharge Burnup: 37000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3348.2 GW(e).h
Energy Availability Factor: 80.9%
Load Factor: 80.8%
Operating Factor: 80.9%
Energy Unavailability Factor: 19.1%
Total Off-line Time: 1669 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	350.8	317.9	351.3	340.5	0.0	0.0	351.9	351.8	340.2	351.9	240.3	351.8	3348.2
EAF (%)	100.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0	99.9	100.0	70.5	100.0	80.9
UCF (%)	100.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0	99.9	100.0	70.6	100.0	80.9
LF (%)	99.7	100.0	100.0	100.0	0.0	0.0	100.0	100.0	99.9	99.9	70.5	100.0	80.8
OF (%)	100.0	100.0	100.0	100.0	0.0	0.0	100.0	100.0	100.0	100.0	71.5	100.0	80.9
EUUF (%)	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.1	0.0	29.5	0.0	19.1
PUF (%)	0.0	0.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	29.5	0.0	2.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE LOAD MODE

5. Historical Summary

Date of Construction Start: 10 Jan 1979 **Lifetime Generation:** 79378.0 GW(e).h
Date of First Criticality: 08 Sep 1987 **Cumulative Energy Availability Factor:** 87.4%
Date of Grid Connection: 16/08/1987 **Cumulative Load Factor:** 88.8%
Date of Commercial Operation: 11 Jan 1987 **Cumulative Unit Capability Factor:** 87.5%
Cumulative Energy Unavailability Factor: 12.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	618.3	425	100.0	100.0	100.0	100.0	101.8	101.8	1464	100.0
1988	3200.9	415	85.6	87.7	85.6	87.7	87.8	89.8	7564	86.1
1989	3425.3	415	89.7	88.6	89.7	88.6	94.2	91.8	7974	91.0
1990	3064.5	435	76.7	84.7	76.7	84.7	80.4	88.1	7253	82.8
1991	3343.0	410	86.5	85.2	86.5	85.2	93.1	89.3	7787	88.9
1992	3702.8	433	90.9	86.3	90.7	86.3	97.4	90.9	8082	92.0
1993	3537.2	430	87.5	86.5	87.0	86.4	93.9	91.4	7767	88.7
1994	2971.2	433	78.1	85.3	78.1	85.2	78.3	89.5	7019	80.1
1995	3443.8	433	90.8	86.0	90.4	85.9	90.8	89.7	8049	91.9
1996	3487.5	433	91.3	86.6	90.7	86.4	91.7	89.9	8087	92.1
1997	3487.1	433	92.0	87.1	91.6	86.9	91.9	90.1	8098	92.4
1998	3136.1	433	84.3	86.9	83.7	86.6	82.7	89.4	7389	84.3
1999	3464.0	433	89.3	87.1	89.3	86.8	91.3	89.6	8046	91.8
2000	3578.4	433	92.3	87.5	92.2	87.3	94.1	89.9	8116	92.4
2001	3471.7	444	90.1	87.7	90.0	87.5	89.3	89.9	7916	90.4
2002	3182.9	444	83.4	87.4	83.1	87.2	81.8	89.3	7287	83.2
2003	3607.6	444	93.0	87.7	92.8	87.5	92.8	89.6	8119	92.7
2004	3396.6	444	87.1	87.7	87.1	87.5	87.1	89.4	7878	89.7
2005	3548.8	444	91.2	87.9	91.2	87.7	91.2	89.5	8046	91.8
2006	3185.2	444	81.9	87.6	81.9	87.4	81.9	89.1	7196	82.1
2007	3810.4	473	92.0	87.8	92.0	87.6	92.0	89.3	8078	92.2
2008	3671.4	473	88.4	87.8	88.4	87.7	88.4	89.2	7854	89.4
2009	3643.1	473	88.0	87.8	88.0	87.7	87.9	89.2	7715	88.1
2010	3348.2	473	80.9	87.5	80.9	87.4	80.8	88.8	7091	80.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		212			63	
C. Inspection, maintenance or repair combined with refuelling	1464			839	23	
D. Inspection, maintenance or repair without refuelling				5		
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				3		
L. Human factor related					3	
Z. Others					3	
Subtotal	1464	212	0	848	92	0
Total		1676			940	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		13
15. Reactor Cooling Systems		14
16. Steam generation systems	212	5
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		4
41. Main Generator Systems		0
42. Electrical Power Supply Systems		1
Total	212	54

IN-13 KAIGA-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 998.5 GW(e).h
Energy Availability Factor: 57.4%
Load Factor: 56.4%
Operating Factor: 97.4%
Energy Unavailability Factor: 42.6%
Total Off-line Time: 225 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	72.8	68.5	76.1	74.1	64.1	73.8	86.8	96.5	95.3	84.4	98.5	107.6	998.5
EAF (%)	49.4	51.5	51.7	51.9	43.7	51.7	58.8	65.2	66.5	57.1	68.7	72.6	57.4
UCF (%)	100.0	100.0	100.0	100.0	88.3	100.0	93.2	100.0	100.0	88.6	100.0	100.0	97.5
LF (%)	48.5	50.5	50.7	50.9	42.7	50.7	57.8	64.2	65.5	56.1	67.7	71.6	56.4
OF (%)	100.0	100.0	100.0	100.0	88.2	100.0	93.1	100.0	100.0	88.4	100.0	100.0	97.4
EUf (%)	50.6	48.5	48.3	48.1	56.3	48.3	41.2	34.8	33.5	42.9	31.3	27.4	42.6
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.4	0.0	0.0	1.0
UCLF (%)	0.0	0.0	0.0	0.0	11.7	0.0	6.8	0.0	0.0	0.0	0.0	0.0	1.6
XUF (%)	50.6	48.5	48.3	48.1	44.6	48.3	34.5	34.8	33.5	31.5	31.3	27.4	40.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THIS UNIT ACHIEVED AN ANNUAL CAPACITY FACTOR AND AVAILABILITY FACTOR OF 59.8% AND 98.9% RESPECTIVELY. UNIT CONTINUED TO OPERATE AT A REDUCED POWER LEVEL BETWEEN 52% FULL POWER TO 74% FULL POWER DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 09 Jan 1989
Date of First Criticality: 26/09/2000
Date of Grid Connection: 10 Dec 2000
Date of Commercial Operation: 16/11/2000

Lifetime Generation: 11934.6 GW(e).h
Cumulative Energy Availability Factor: 68.4%
Cumulative Load Factor: 67.0%
Cumulative Unit Capability Factor: 89.9%
Cumulative Energy Unavailability Factor: 31.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	188.4	200	86.9	86.9	86.9	86.9	64.4	64.4	1037	70.8
2001	1241.1	200	75.8	77.4	70.4	72.8	70.8	69.9	6316	72.1
2002	1692.9	202	95.6	85.8	92.4	81.9	95.7	81.9	8082	92.3
2003	1336.0	202	87.5	86.4	83.4	82.4	75.5	79.8	7255	82.8
2004	1344.9	202	94.6	88.4	77.8	81.3	75.8	78.9	8181	93.1
2005	1183.6	202	88.9	88.5	66.5	78.4	66.9	76.5	7580	86.5
2006	1167.3	202	97.4	89.9	67.0	76.5	66.0	74.8	8524	97.3
2007	946.3	202	82.9	88.9	54.4	73.4	53.5	71.8	7250	82.8
2008	1103.0	202	100.0	90.3	63.2	72.2	62.2	70.7	8784	100.0
2009	842.1	202	79.6	89.1	48.6	69.6	47.6	68.1	6953	79.4
2010	998.5	202	97.5	89.9	57.4	68.4	56.4	67.0	8535	97.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		138			423	
B. Refuelling without a maintenance					16	
D. Inspection, maintenance or repair without refuelling	85			264		
E. Testing of plant systems or components				10	0	
H. Nuclear regulatory requirements					22	
J. Grid limitation, failure or grid unavailability						144
Z. Others					81	
Subtotal	85	138	0	274	542	144
Total		223			960	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		27
12. Reactor I&C Systems	50	29
13. Reactor Auxiliary Systems		4
14. Safety Systems		18
15. Reactor Cooling Systems		14
17. Safety I&C Systems (excluding reactor I&C)		19
21. Fuel Handling and Storage Facilities		45
31. Turbine and auxiliaries		58
32. Feedwater and Main Steam System		23
35. All other I&C Systems		0
41. Main Generator Systems	88	166
42. Electrical Power Supply Systems		5
XX. Miscellaneous Systems		9
Total	138	417

IN-14 KAIGA-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 794.7 GW(e).h
Energy Availability Factor: 45.9%
Load Factor: 44.9%
Operating Factor: 80.3%
Energy Unavailability Factor: 54.1%
Total Off-line Time: 1729 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	72.7	68.4	81.0	81.5	7.4	1.3	35.5	83.5	82.9	88.7	90.3	101.4	794.7
EAF (%)	49.4	51.4	54.9	57.0	5.9	1.9	24.6	56.6	58.0	60.0	63.1	68.5	45.9
UCF (%)	100.0	100.0	100.0	100.0	10.6	8.4	49.5	98.7	100.0	100.0	100.0	100.0	80.5
LF (%)	48.4	50.4	53.9	56.0	4.9	0.9	23.6	55.6	57.0	59.0	62.1	67.5	44.9
OF (%)	100.0	100.0	100.0	100.0	9.7	7.4	48.9	98.7	100.0	100.0	100.0	100.0	80.3
EUf (%)	50.6	48.6	45.1	43.0	94.1	98.1	75.4	43.4	42.0	40.0	36.9	31.5	54.1
PUF (%)	0.0	0.0	0.0	0.0	89.4	52.3	0.0	0.0	0.0	0.0	0.0	0.0	11.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	39.3	50.6	1.3	0.0	0.0	0.0	0.0	7.6
XUF (%)	50.6	48.6	45.1	43.0	4.7	6.5	24.8	42.2	42.0	40.0	36.9	31.5	34.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THIS UNIT ACHIEVED AN ANNUAL CAPACITY FACTOR AND AVAILABILITY FACTOR OF 48.15% AND 80.28% RESPECTIVELY. UNIT OPERATED AT A REDUCED POWER LEVEL OF 52% TO 69% FULL POWER THROUGHOUT THE YEAR DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 12 Jan 1989
Date of First Criticality: 24/09/1999
Date of Grid Connection: 12 Feb 1999
Date of Commercial Operation: 16/03/2000

Lifetime Generation: 12795.6 GW(e).h
Cumulative Energy Availability Factor: 68.4%
Cumulative Load Factor: 67.1%
Cumulative Unit Capability Factor: 88.9%
Cumulative Energy Unavailability Factor: 31.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	1036.0	200	76.9	76.9	76.9	76.9	70.5	70.5	5428	73.9
2001	1308.6	200	82.1	79.7	74.2	75.5	74.7	72.8	6670	76.1
2002	1559.2	202	87.5	82.5	85.8	79.1	88.1	78.2	7455	85.1
2003	1413.0	202	88.7	84.1	86.9	81.2	79.9	78.7	7535	86.0
2004	1290.2	202	91.0	85.6	74.7	79.8	72.7	77.4	7732	88.0
2005	1509.4	202	96.4	87.4	82.9	80.4	85.3	78.8	8428	96.2
2006	1064.2	202	89.2	87.7	61.1	77.5	60.1	76.0	7806	89.1
2007	1083.1	202	100.0	89.3	62.2	75.6	61.2	74.1	8757	100.0
2008	816.5	202	85.5	88.8	47.0	72.3	46.0	70.9	7040	80.1
2009	970.0	202	98.1	89.8	55.8	70.6	54.8	69.3	8589	98.0
2010	794.7	202	80.5	88.9	45.9	68.4	44.9	67.1	7031	80.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		674			522	
D. Inspection, maintenance or repair without refuelling	1051			287	17	
E. Testing of plant systems or components					2	
J. Grid limitation, failure or grid unavailability					0	149
L. Human factor related					16	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						41
Z. Others					5	
Subtotal	1051	674	0	287	562	190
Total		1725			1039	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		119
13. Reactor Auxiliary Systems		9
15. Reactor Cooling Systems		51
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		33
31. Turbine and auxiliaries	665	203
32. Feedwater and Main Steam System		33
41. Main Generator Systems		22
42. Electrical Power Supply Systems	9	35
XX. Miscellaneous Systems		5
Total	674	519

IN-15 KAIGA-3

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
 Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 202.0 MW(e)
 Design Net Capacity: 202.0 MW(e)
 Design Discharge Burnup: —
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1087.8 GW(e).h
 Energy Availability Factor: 62.5%
 Load Factor: 61.5%
 Operating Factor: 94.4%
 Energy Unavailability Factor: 37.5%
 Total Off-line Time: 493 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	85.4	55.8	89.2	95.1	88.8	78.2	75.5	102.4	100.1	104.1	102.6	110.7	1087.8
EAF (%)	57.8	42.1	60.3	66.4	60.0	54.8	51.2	69.1	69.8	70.3	71.5	74.7	62.5
UCF (%)	100.0	69.3	92.0	100.0	97.0	95.8	77.4	100.0	100.0	100.0	100.0	100.0	94.4
LF (%)	56.8	41.1	59.3	65.4	59.1	53.8	50.2	68.2	68.8	69.3	70.5	73.7	61.5
OF (%)	100.0	68.9	91.9	100.0	96.9	95.7	77.2	100.0	100.0	100.0	100.0	100.0	94.4
EUF (%)	42.2	57.9	39.7	33.6	40.0	45.2	48.8	30.9	30.2	29.7	28.5	25.3	37.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	30.7	8.1	0.0	3.0	4.2	22.6	0.0	0.0	0.0	0.0	0.0	5.6
XUF (%)	42.2	27.2	31.6	33.6	36.9	41.0	26.2	30.9	30.2	29.7	28.5	25.3	32.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR UNIT ACHIEVED AN ANNUAL CAPACITY FACTOR AND AVAILABILITY FACTOR OF 64.2% AND 94.38% RESPECTIVELY. IT ACHIEVED 100% AVAILABILITY FACTOR FOR 7 MONTHS IN THE YEAR. UNIT OPERATED CONTINUOUSLY FOR 171 DAYS FROM 13TH JULY 2010 TILL 31 DECEMBER 2010. UNIT OPERATED AT A REDUCED POWER LEVEL BETWEEN 55% FULL POWER TO 70% FULL POWER THROUGHOUT THE YEAR DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 30/03/2002
 Date of First Criticality: 26/02/2007
 Date of Grid Connection: 04 Nov 2007
 Date of Commercial Operation: 05 Jun 2007
 Lifetime Generation: 2558.6 GW(e).h
 Cumulative Energy Availability Factor: 40.2%
 Cumulative Load Factor: 39.3%
 Cumulative Unit Capability Factor: 70.3%
 Cumulative Energy Unavailability Factor: 59.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2007	348.4	202	34.8	34.8	29.9	29.9	29.3	29.3	2008	34.1
2008	372.0	202	63.9	52.2	22.0	25.1	21.0	24.3	2532	28.8
2009	745.4	202	76.5	61.3	43.1	31.9	42.1	31.0	6677	76.2
2010	1087.8	202	94.4	70.3	62.5	40.2	61.5	39.3	8267	94.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2007 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		492			1764	
E. Testing of plant systems or components					120	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)				477		761
Subtotal	0	492	0	477	1884	761
Total		492			3122	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2007 to 2010 Average Hours Lost Per Year
	11. Reactor and Accessories	
12. Reactor I&C Systems	53	
14. Safety Systems	47	
21. Fuel Handling and Storage Facilities	208	
31. Turbine and auxiliaries	130	61
35. All other I&C Systems	51	
41. Main Generator Systems		1607
42. Electrical Power Supply Systems		84
Total	489	1763

IN-9 KAKRAPAR-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 3.5%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 96.5%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
UCF (%)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUf (%)	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5
PUF (%)	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5	96.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT REMAINED SHUTDOWN THROUGHOUT THE YEAR FOR EN-MASSE COOLANT CHANNEL REPLACEMENT AND FEEDER REPLACEMENT WORK.

5. Historical Summary

Date of Construction Start: 12 Jan 1984 **Lifetime Generation:** 16888.5 GW(e).h
Date of First Criticality: 09 Mar 1992 **Cumulative Energy Availability Factor:** 59.5%
Date of Grid Connection: 24/11/1992 **Cumulative Load Factor:** 56.1%
Date of Commercial Operation: 05 Jun 1993 **Cumulative Unit Capability Factor:** 67.5%
Cumulative Energy Unavailability Factor: 40.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993			Data not provided							
1994	130.3	194	13.2	13.2	12.0	12.0	7.7	7.7	1049	12.0
1995	1089.1	195	70.5	41.9	66.5	39.3	63.8	35.8	6225	71.1
1996	1295.8	195	84.6	56.2	75.7	51.5	75.7	49.1	7539	85.8
1997	906.7	195	58.4	56.8	52.9	51.8	53.1	50.1	5140	58.7
1998	1090.6	195	67.0	58.8	63.1	54.1	63.8	52.9	5987	68.3
1999	1407.1	195	87.7	63.6	85.1	59.2	82.4	57.8	7450	85.0
2000	1645.4	195	95.2	68.2	94.5	64.3	96.1	63.3	8445	96.1
2001	1517.5	195	86.5	70.4	86.5	67.1	88.8	66.5	7690	87.8
2002	1697.8	202	96.8	73.5	96.7	70.5	95.9	69.8	8488	96.9
2003	1419.4	202	87.5	74.9	81.9	71.6	80.2	70.9	7622	87.0
2004	1064.4	202	89.1	76.2	89.1	73.3	60.0	69.9	7416	84.4
2005	1089.4	202	94.2	77.8	63.1	72.4	61.6	69.2	7969	91.0
2006	985.6	202	83.9	78.2	59.8	71.4	55.7	68.1	7316	83.5
2007	828.7	202	80.5	78.4	53.3	70.1	46.8	66.6	6867	78.4
2008	438.1	202	49.7	76.4	30.0	67.4	24.7	63.7	4210	47.9
2009	0.0	202	0.0	71.6	0.0	63.1	0.0	59.7	0	0.0
2010	0.0	202	3.5	67.5	3.5	59.5	0.0	56.1	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					503	
D. Inspection, maintenance or repair without refuelling				791		
E. Testing of plant systems or components				69	60	
F. Major back-fitting, refurbishment or upgrading activities with refuelling	8760			775		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						19
H. Nuclear regulatory requirements					66	
J. Grid limitation, failure or grid unavailability						60
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	8
L. Human factor related					6	
Subtotal	8760	0	0	1635	645	87
Total		8760			2367	

7. Equipment Related Full Outages, Analysis by System

System	2010	1994 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		41
12. Reactor I&C Systems		41
13. Reactor Auxiliary Systems		14
15. Reactor Cooling Systems		104
16. Steam generation systems		11
17. Safety I&C Systems (excluding reactor I&C)		13
31. Turbine and auxiliaries		100
32. Feedwater and Main Steam System		14
35. All other I&C Systems		14
41. Main Generator Systems		80
42. Electrical Power Supply Systems		48
Total	0	480

IN-10 KAKRAPAR-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 751.1 GW(e).h
Energy Availability Factor: 45.9%
Load Factor: 42.4%
Operating Factor: 86.0%
Energy Unavailability Factor: 54.1%
Total Off-line Time: 1230 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	70.1	72.1	84.9	79.1	66.9	62.1	74.0	34.8	-3.4	64.2	51.1	95.2	751.1
EAF (%)	50.1	56.6	59.9	57.8	48.0	46.1	52.7	26.6	1.2	46.2	38.6	66.8	45.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	45.8	3.8	100.0	87.5	100.0	86.5
LF (%)	46.7	53.1	56.5	54.4	44.5	42.7	49.3	23.1	-2.3	42.7	35.1	63.4	42.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	43.8	0.3	100.0	86.9	100.0	86.0
EUF (%)	49.9	43.4	40.1	42.2	52.0	53.9	47.3	73.4	98.8	53.8	61.4	33.2	54.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.2	96.2	0.0	12.5	0.0	13.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	49.9	43.4	40.1	42.2	52.0	53.9	47.3	19.2	2.6	53.8	48.9	33.2	40.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR OF 85.97%. THERE WAS NO UNPLANNED OUTAGE. UNIT OPERATED AT A REDUCED POWER LEVEL BETWEEN 50% FULL POWER TO 75% FULL POWER THROUGHOUT THE YEAR DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY. THERE WAS ONE UNPLANNED AUTO SCRAM AND ONE UNPLANNED MANUAL SCRAM DURING REACTOR STARTUP.

5. Historical Summary

Date of Construction Start: 04 Jan 1985
Date of First Criticality: 01 Aug 1995
Date of Grid Connection: 03 Apr 1995
Date of Commercial Operation: 09 Jan 1995

Lifetime Generation: 19004.5 GW(e).h
Cumulative Energy Availability Factor: 73.8%
Cumulative Load Factor: 70.3%
Cumulative Unit Capability Factor: 88.5%
Cumulative Energy Unavailability Factor: 26.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1995	452.7	196	92.0	92.0	88.2	88.2	79.3	79.3	2513	85.8
1996	1326.8	195	86.3	87.7	77.5	80.2	77.5	77.9	7663	87.2
1997	1093.4	195	66.7	78.7	63.8	73.2	64.0	72.0	6139	70.1
1998	1291.6	195	78.7	78.7	76.6	74.2	75.6	73.1	6932	79.1
1999	1512.3	195	92.4	81.8	91.1	78.1	88.5	76.6	7955	90.8
2000	1489.9	195	85.8	82.6	85.6	79.5	87.0	78.6	7697	87.6
2001	1685.4	195	96.0	84.7	95.3	82.0	98.7	81.7	8500	97.0
2002	1597.1	202	89.5	85.4	89.2	83.0	90.3	82.9	7940	90.6
2003	1613.2	202	97.3	86.8	92.3	84.1	91.2	84.0	8515	97.2
2004	1142.0	202	90.9	87.3	90.9	84.9	64.4	81.8	7658	87.2
2005	1255.0	202	92.9	87.8	72.3	83.6	70.9	80.7	7979	91.1
2006	865.8	202	74.6	86.7	53.1	80.9	48.9	77.9	6473	73.9
2007	1011.7	202	97.0	87.5	63.1	79.4	57.2	76.2	8447	96.4
2008	938.1	202	97.8	88.3	60.1	78.0	52.9	74.4	8596	97.9
2009	780.4	202	92.5	88.6	47.6	75.8	44.1	72.2	7506	85.7
2010	751.1	202	86.5	88.5	45.9	73.8	42.4	70.3	7530	86.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		0			456	
B. Refuelling without a maintenance					8	
D. Inspection, maintenance or repair without refuelling	1228			385	46	
E. Testing of plant systems or components				8	21	
G. Major back-fitting, refurbishment or upgrading activities without refuelling						3
H. Nuclear regulatory requirements					55	
J. Grid limitation, failure or grid unavailability						31
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
L. Human factor related		0			0	
Z. Others					0	
Subtotal	1228	0	0	393	589	34
Total		1228			1016	

7. Equipment Related Full Outages, Analysis by System

System	2010	1995 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		26
13. Reactor Auxiliary Systems		9
14. Safety Systems		10
15. Reactor Cooling Systems	0	22
16. Steam generation systems		12
17. Safety I&C Systems (excluding reactor I&C)		33
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		106
32. Feedwater and Main Steam System		82
35. All other I&C Systems		3
41. Main Generator Systems		66
42. Electrical Power Supply Systems		68
Total	0	441

IN-5 MADRAS-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 205.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1024.4 GW(e).h
Energy Availability Factor: 57.0%
Load Factor: 57.0%
Operating Factor: 98.3%
Energy Unavailability Factor: 43.0%
Total Off-line Time: 146 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	81.4	76.5	84.3	83.1	80.3	81.5	90.6	85.7	92.6	95.8	79.1	93.5	1024.4
EAF (%)	53.4	55.5	55.3	56.3	52.6	55.2	59.4	56.2	62.8	62.8	53.6	61.3	57.0
UCF (%)	100.0	100.0	99.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.6	88.4	98.3
LF (%)	53.4	55.5	55.3	56.3	52.6	55.2	59.4	56.2	62.8	62.8	53.6	61.3	57.0
OF (%)	100.0	100.0	99.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.5	88.4	98.3
EUf (%)	46.6	44.5	44.7	43.7	47.4	44.8	40.6	43.8	37.2	37.2	46.4	38.7	43.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	11.6	1.7
XUF (%)	46.6	44.5	43.9	43.7	47.4	44.8	40.6	43.8	37.2	37.2	39.0	27.1	41.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR THIS UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR OF 98.34%. UNIT CREATED A NEW RECORD OF 346 DAYS OF CONTINUOUS OPERATION FROM 17 DECEMBER 2009 TO 27 NOVEMBER 2010. UNIT OPERATED AT A REDUCED POWER LEVEL BETWEEN 51% FULL POWER TO 91% FULL POWER DURING THE YEAR DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 01 Jan 1971 **Lifetime Generation:** 22189.9 GW(e).h
Date of First Criticality: 07 Feb 1983 **Cumulative Energy Availability Factor:** 53.2%
Date of Grid Connection: 23/07/1983 **Cumulative Load Factor:** 48.8%
Date of Commercial Operation: 27/01/1984 **Cumulative Unit Capability Factor:** 61.3%
Cumulative Energy Unavailability Factor: 46.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1984	1115.8	210	61.0	61.0	60.5	60.5	60.5	60.5	60.5	60.5	6333	72.1
1985	822.1	215	50.1	55.5	49.5	54.9	43.6	52.0	48.27	55.1	4827	55.1
1986	757.1	220	40.7	50.5	39.3	49.6	39.3	47.7	46.29	52.8	4629	52.8
1987	1100.0	220	61.0	53.2	57.1	51.5	57.1	50.1	60.47	69.0	6047	69.0
1988	1258.0	220	65.7	55.7	65.1	54.3	65.1	53.1	66.91	76.2	6691	76.2
1989	404.6	220	21.0	49.8	21.0	48.7	21.0	47.7	43.50	49.7	4350	49.7
1990	863.7	215	47.8	49.6	45.6	48.2	45.9	47.4	73.20	83.6	7320	83.6
1991	499.9	215	44.8	49.0	44.4	47.7	26.5	44.9	35.46	40.5	3546	40.5
1992	1082.6	194	87.3	52.8	84.6	51.5	63.5	46.7	74.12	84.4	7412	84.4
1993	538.9	194	46.3	52.2	43.9	50.8	31.7	45.4	38.36	43.8	3836	43.8
1994	809.0	194	72.5	53.9	66.6	52.1	47.6	45.5	59.74	68.2	5974	68.2
1995	1085.2	194	98.4	57.4	86.8	54.8	63.9	47.0	75.84	86.6	7584	86.6
1996	617.1	161	50.6	57.0	50.6	54.5	43.7	46.8	43.48	49.5	4348	49.5
1997	893.0	150	74.3	57.9	68.0	55.2	68.0	47.9	64.51	73.6	6451	73.6
1998	703.4	150	56.1	57.8	55.5	55.2	53.5	48.2	48.58	55.5	4858	55.5
1999	1182.4	150	92.5	59.5	92.5	57.0	90.0	50.2	80.95	92.4	8095	92.4
2000	667.8	150	50.9	59.1	50.9	56.8	50.7	50.2	44.68	50.9	4468	50.9
2001	1174.5	150	90.1	60.4	88.5	58.1	89.4	51.9	77.51	88.5	7751	88.5
2002	895.8	155	69.7	60.8	67.7	58.6	66.0	52.5	58.85	67.2	5885	67.2
2003	810.6	155	65.3	61.0	65.3	58.8	59.7	52.8	54.21	61.9	5421	61.9
2004	0.0	155	0.0	58.6	0.0	56.5	0.0	50.7	0	0.0	0	0.0
2005	0.0	155	0.0	56.3	0.0	54.3	0.0	48.8	0	0.0	0	0.0
2006	1225.0	185	89.3	57.9	68.6	55.0	70.2	49.8	78.23	89.3	7823	89.3
2007	695.8	205	66.4	58.3	39.3	54.3	38.7	49.3	58.14	66.4	5814	66.4
2008	697.9	205	77.3	59.1	38.8	53.6	38.8	48.8	67.91	77.3	6791	77.3
2009	721.6	205	73.1	59.7	40.2	53.0	40.2	48.4	64.04	73.1	6404	73.1
2010	1024.4	205	98.3	61.3	57.0	53.2	57.0	48.8	86.14	98.3	8614	98.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		6			909	6
B. Refuelling without a maintenance					6	
D. Inspection, maintenance or repair without refuelling				696		
E. Testing of plant systems or components				11	58	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				340		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				325		
H. Nuclear regulatory requirements				587		
J. Grid limitation, failure or grid unavailability					7	97
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					18	
L. Human factor related		139				
Subtotal	0	145	0	1959	998	103
Total		145			3060	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		137
12. Reactor I&C Systems		71
13. Reactor Auxiliary Systems		23
15. Reactor Cooling Systems		68
16. Steam generation systems		26
17. Safety I&C Systems (excluding reactor I&C)		30
31. Turbine and auxiliaries	6	94
32. Feedwater and Main Steam System		56
35. All other I&C Systems		3
41. Main Generator Systems		26
42. Electrical Power Supply Systems		322
XX. Miscellaneous Systems		19
Total	6	875

2010 Operating Experience

IN-6 MADRAS-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 205.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 806.1 GW(e).h
Energy Availability Factor: 44.9%
Load Factor: 44.9%
Operating Factor: 86.7%
Energy Unavailability Factor: 55.1%
Total Off-line Time: 1164 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	76.3	67.7	76.5	53.3	72.8	75.7	83.5	81.5	82.8	83.8	52.1	0.0	806.1
EAF (%)	50.0	49.2	50.2	36.1	47.8	51.3	54.7	53.5	56.1	55.0	35.3	0.0	44.9
UCF (%)	100.0	100.0	100.0	75.1	100.0	100.0	100.0	100.0	100.0	99.9	66.7	0.0	86.7
LF (%)	50.0	49.2	50.2	36.1	47.8	51.3	54.7	53.5	56.1	55.0	35.3	0.0	44.9
OF (%)	100.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0	100.0	100.0	66.7	0.0	86.7
EUF (%)	50.0	50.8	49.8	63.9	52.2	48.7	45.3	46.5	43.9	45.0	64.7	100.0	55.1
PUF (%)	0.0	0.0	0.0	24.9	0.0	0.0	0.0	0.0	0.0	0.0	33.3	100.0	13.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
XUF (%)	50.0	50.8	49.8	38.9	52.2	48.7	45.3	46.5	43.9	45.0	31.4	0.0	41.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR OF 87%. UNIT CREATED A NEW RECORD OF CONTINUOUS OPERATION FOR 432 DAYS FROM 25TH JANUARY 2009 TO 2ND APRIL 2010 WHEN IT WAS MANUALLY TRIPPED FOR CARRYING OUT MANDATORY SURVEILLANCE TESTS AND AFTER THE MANDATORY SURVEILLANCE TESTS, THE UNIT WAS SYNCHRONIZED ON 9TH APRIL 2010 AND OPERATED CONTINUOUSLY FOR 226 DAYS UPTO 28TH NOVEMBER 2010 WHEN IT WAS AGAIN SHUTDOWN FOR BIENNIAL (2 YEARS) MAINTENANCE WORKS. UNIT OPERATED AT A REDUCED POWER LEVEL BETWEEN 51% FULL POWER TO 76% FULL POWER DURING THE YEAR DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 10 Jan 1972 **Lifetime Generation:** 22406.3 GW(e).h
Date of First Criticality: 08 Dec 1985 **Cumulative Energy Availability Factor:** 58.3%
Date of Grid Connection: 20/09/1985 **Cumulative Load Factor:** 54.8%
Date of Commercial Operation: 21/03/1986 **Cumulative Unit Capability Factor:** 68.5%
Cumulative Energy Unavailability Factor: 41.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	649.9	220	40.2	40.2	40.2	40.2	40.2	40.2	4409	60.0
1987	1066.0	220	62.5	52.3	55.5	48.5	55.3	48.4	6382	72.9
1988	642.0	220	33.2	45.6	33.2	43.1	33.2	43.1	3535	40.2
1989	438.2	220	22.7	39.6	22.7	37.8	22.7	37.8	4350	49.7
1990	1082.4	215	61.6	44.1	57.2	41.7	57.5	41.8	7726	88.2
1991	1083.0	215	87.2	51.4	86.6	49.3	57.5	44.4	7642	87.2
1992	665.2	194	55.2	51.9	54.2	50.0	39.0	43.7	4751	54.1
1993	950.3	205	80.2	55.3	77.1	53.3	52.9	44.8	6625	75.6
1994	1032.1	194	85.5	58.5	80.9	56.1	60.7	46.5	7071	80.7
1995	274.7	194	22.7	55.1	21.4	52.9	16.2	43.6	1871	21.4
1996	1061.9	161	84.7	57.3	82.2	55.0	75.1	45.9	7256	82.6
1997	958.2	150	75.6	58.4	72.4	56.1	72.9	47.6	6464	73.8
1998	1104.2	150	87.0	60.1	85.4	57.8	84.0	49.8	7478	85.4
1999	879.9	150	68.0	60.6	65.7	58.3	67.0	50.8	5755	65.7
2000	1273.4	150	95.7	62.4	94.6	60.2	96.6	53.2	8304	94.5
2001	1119.1	150	88.5	63.7	87.6	61.6	85.2	54.8	7671	87.6
2002	22.7	155	1.7	60.7	1.7	58.6	1.7	52.2	183	2.1
2003	589.1	155	40.0	59.7	40.0	57.7	43.4	51.8	3135	35.8
2004	1274.3	155	92.4	61.2	90.9	59.2	93.6	53.7	7970	90.7
2005	1475.8	155	92.5	62.5	91.3	60.6	108.7	56.0	8165	93.2
2006	1086.6	202	90.0	64.0	59.9	60.6	61.4	56.3	7894	90.1
2007	971.1	202	97.4	65.7	54.1	60.3	54.9	56.2	8537	97.5
2008	715.7	202	80.4	66.4	39.0	59.2	40.3	55.5	7080	80.6
2009	931.5	205	93.4	67.6	51.9	58.9	51.9	55.3	8178	93.4
2010	806.1	205	86.7	68.5	44.9	58.3	44.9	54.8	7596	86.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		0			838	5
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling					9	
D. Inspection, maintenance or repair without refuelling	983			608		
E. Testing of plant systems or components	179			50	8	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				538		
H. Nuclear regulatory requirements				135	5	
J. Grid limitation, failure or grid unavailability					3	89
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	15
Subtotal	1162	0	0	1331	877	109
Total		1162			2317	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		231
12. Reactor I&C Systems		51
13. Reactor Auxiliary Systems		9
14. Safety Systems		4
15. Reactor Cooling Systems		147
16. Steam generation systems		36
17. Safety I&C Systems (excluding reactor I&C)		14
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries	0	110
32. Feedwater and Main Steam System		27
35. All other I&C Systems		3
41. Main Generator Systems		48
42. Electrical Power Supply Systems		49
XX. Miscellaneous Systems		12
Total	0	748

IN-7 NARORA-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 15000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 956.9 GW(e).h
Energy Availability Factor: 56.1%
Load Factor: 54.1%
Operating Factor: 93.5%
Energy Unavailability Factor: 43.9%
Total Off-line Time: 569 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	64.7	72.1	84.4	77.0	47.3	68.4	89.8	80.7	80.2	94.4	96.6	101.3	956.9
EAF (%)	45.1	55.1	58.2	54.9	33.5	49.0	61.7	55.6	57.1	64.8	68.4	69.4	56.1
UCF (%)	83.6	100.0	99.5	100.0	65.2	93.4	100.0	91.2	93.5	100.0	100.0	98.3	93.6
LF (%)	43.1	53.1	56.2	52.9	31.5	47.0	59.7	53.7	55.2	62.8	66.4	67.4	54.1
OF (%)	83.3	100.0	99.5	100.0	64.5	93.2	100.0	91.0	93.3	100.0	100.0	98.3	93.5
EUf (%)	54.9	44.9	41.8	45.1	66.5	51.0	38.3	44.4	42.9	35.2	31.6	30.6	43.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	16.4	0.0	0.6	0.0	34.8	6.6	0.0	8.8	6.5	0.0	0.0	1.8	6.4
XUF (%)	38.6	44.9	41.3	45.1	31.7	44.4	38.3	35.5	36.3	35.2	31.6	28.9	37.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT ACHIEVED THE CAPACITY FACTOR AND AVAILABILITY FACTOR OF 58.8% AND 93.5% RESPECTIVELY.
 UNIT OPERATED AT A REDUCED POWER LEVEL DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 12 Jan 1976 **Lifetime Generation:** 18387.2 GW(e).h
Date of First Criticality: 03 Dec 1989 **Cumulative Energy Availability Factor:** 54.1%
Date of Grid Connection: 29/07/1989 **Cumulative Load Factor:** 51.4%
Date of Commercial Operation: 01 Jan 1991 **Cumulative Unit Capability Factor:** 64.0%
Cumulative Energy Unavailability Factor: 45.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1991	449.3	210	42.8	42.8	42.3	42.3	24.4	24.4	4331	49.4
1992	742.7	200	42.8	42.8	42.3	42.3	42.3	33.1	5514	62.8
1993	339.6	200	19.4	35.1	19.4	34.8	19.4	28.6	2032	23.2
1994	0.0	200	0.0	26.5	0.0	26.2	0.0	21.6	0	0.0
1995	944.4	200	68.3	34.7	66.0	34.1	53.9	28.0	5740	65.5
1996	1162.3	200	76.9	41.7	66.2	39.4	66.2	34.3	6407	72.9
1997	1585.2	200	92.8	49.0	89.3	46.5	90.5	42.3	8128	92.8
1998	1485.6	200	90.8	54.2	83.9	51.1	84.8	47.5	7986	91.2
1999	1128.6	200	76.8	56.7	76.5	53.9	64.4	49.4	6703	76.5
2000	1386.3	200	87.2	59.7	83.4	56.8	78.9	52.3	7452	84.8
2001	1563.0	200	91.9	62.6	89.2	59.8	89.2	55.7	8157	93.1
2002	1574.5	202	89.3	64.9	88.0	62.1	89.0	58.5	7912	90.3
2003	1528.2	202	95.1	67.2	86.0	64.0	86.4	60.6	8254	94.2
2004	1120.6	202	82.5	68.3	64.8	64.0	63.2	60.8	6860	78.1
2005	1064.8	202	80.5	69.1	62.4	63.9	60.2	60.8	6924	79.0
2006	0.0	202	0.0	64.8	0.0	59.9	0.0	57.0	0	0.0
2007	0.0	202	0.0	61.0	0.0	56.4	0.0	53.6	0	0.0
2008	567.2	202	76.8	61.8	33.6	55.1	32.0	52.4	5963	67.9
2009	551.1	202	72.5	62.4	33.1	54.0	31.1	51.3	6298	71.9
2010	956.9	202	93.6	64.0	56.1	54.1	54.1	51.4	8191	93.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		560			921	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				98		
D. Inspection, maintenance or repair without refuelling				714		
E. Testing of plant systems or components				23	18	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				140		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				876	17	
H. Nuclear regulatory requirements				96	10	
J. Grid limitation, failure or grid unavailability			5			67
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						12
L. Human factor related		4				
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						30
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)				42		
Z. Others						3
Subtotal	0	564	5	1989	967	112
Total		569			3068	

7. Equipment Related Full Outages, Analysis by System

System	2010	1991 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		24
12. Reactor I&C Systems	46	59
13. Reactor Auxiliary Systems		22
15. Reactor Cooling Systems	159	144
16. Steam generation systems	78	9
17. Safety I&C Systems (excluding reactor I&C)		29
21. Fuel Handling and Storage Facilities	264	2
31. Turbine and auxiliaries	13	429
32. Feedwater and Main Steam System		19
33. Circulating Water System		2
41. Main Generator Systems		77
42. Electrical Power Supply Systems		66
XX. Miscellaneous Systems		2
Total	560	884

IN-8 NARORA-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 15000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 289.2 GW(e).h
Energy Availability Factor: 18.3%
Load Factor: 16.3%
Operating Factor: 26.1%
Energy Unavailability Factor: 81.7%
Total Off-line Time: 6478 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	96.6	94.0	97.9	289.2
EAF (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.4	66.2	66.6	67.1	18.3
UCF (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	15.7	100.0	99.6	100.0	27.8
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	64.3	64.7	65.2	16.3
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7	100.0	99.6	100.0	26.1
EUf (%)	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	97.6	33.8	33.4	32.9	81.7
PUF (%)	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	19.5	0.0	0.0	0.0	66.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	64.8	0.0	0.4	0.0	5.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3	33.8	33.0	32.9	9.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

AFTER COMPLETION OF ENMASSE COOLANT CHANNEL REPLACEMENT AND UPGRADATION WORK, UNIT-2 WAS SYNCHRONIZED TO THE GRID AT 2319 HOURS ON 6TH SEPTEMBER 2010.

5. Historical Summary

Date of Construction Start: 11 Jan 1977 **Lifetime Generation:** 18277.2 GW(e).h
Date of First Criticality: 24/10/1991 **Cumulative Energy Availability Factor:** 57.1%
Date of Grid Connection: 01 May 1992 **Cumulative Load Factor:** 56.1%
Date of Commercial Operation: 07 Jan 1992 **Cumulative Unit Capability Factor:** 64.9%
Cumulative Energy Unavailability Factor: 42.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1992	567.0	201	65.2	65.2	64.2	64.2	64.2	64.2	3553	80.5
1993	83.3	200	4.8	25.1	4.8	24.7	4.8	24.7	548	6.3
1994	761.7	200	53.1	36.3	43.5	32.2	43.5	32.2	5494	62.7
1995	1036.8	200	68.6	45.5	66.1	41.9	59.2	39.9	5798	66.2
1996	1227.5	200	79.4	53.0	69.9	48.1	69.9	46.6	6572	74.8
1997	1568.7	200	91.4	60.0	89.2	55.6	89.5	54.4	8121	92.7
1998	1333.2	200	80.1	63.1	75.1	58.6	76.1	57.7	6829	78.0
1999	1425.9	200	87.0	66.3	85.8	62.2	81.4	60.9	7468	85.3
2000	1340.8	200	80.6	68.0	79.9	64.3	76.3	62.7	7182	81.8
2001	1343.0	200	75.4	68.7	74.5	65.4	76.7	64.2	6897	78.7
2002	1692.8	202	95.7	71.3	94.8	68.2	95.7	67.2	8416	96.1
2003	1287.1	202	85.4	72.6	70.7	68.4	72.7	67.7	7458	85.1
2004	1364.6	202	96.7	74.5	78.9	69.2	76.9	68.4	8447	96.2
2005	1222.9	202	93.2	75.9	71.5	69.4	69.1	68.5	7907	90.3
2006	1229.4	202	94.6	77.2	71.9	69.6	69.5	68.5	8278	94.5
2007	496.8	202	54.9	75.8	30.0	67.0	28.1	65.9	4808	54.9
2008	0.0	202	0.0	71.1	0.0	62.9	0.0	61.9	0	0.0
2009	0.0	202	0.0	67.1	0.0	59.3	0.0	58.3	0	0.0
2010	289.2	202	27.8	64.9	18.3	57.1	16.3	56.1	2282	26.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1992 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		26			474	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling				67		
D. Inspection, maintenance or repair without refuelling				879	1	
E. Testing of plant systems or components				9	21	
F. Major back-fitting, refurbishment or upgrading activities with refuelling	5975			939		
H. Nuclear regulatory requirements				27	24	
J. Grid limitation, failure or grid unavailability					2	89
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
P. Fire		453				
Subtotal	5975	479	0	1921	536	89
Total		6454			2546	

7. Equipment Related Full Outages, Analysis by System

System	2010	1992 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		40
12. Reactor I&C Systems		44
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems		52
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		12
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries		166
32. Feedwater and Main Steam System	23	23
41. Main Generator Systems	3	28
42. Electrical Power Supply Systems		65
Total	26	444

IN-3 RAJASTHAN-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 90.0 MW(e)
Design Net Capacity: 207.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT CONTINUED TO REMAIN SHUTDOWN THROUGHOUT THE YEAR. TECHNO-ECONOMIC ASPECTS FOR THE UNITS ARE BEING REVIEWED.

5. Historical Summary

Date of Construction Start: 08 Jan 1965
Date of First Criticality: 08 Nov 1972
Date of Grid Connection: 30/11/1972
Date of Commercial Operation: 16/12/1973

Lifetime Generation: 10138.4 GW(e).h
Cumulative Energy Availability Factor: 23.6%
Cumulative Load Factor: 20.3%
Cumulative Unit Capability Factor: 24.5%
Cumulative Energy Unavailability Factor: 76.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	55.0	145	90.6	90.6	90.6	90.6	51.0	51.0	553	74.3
1974	667.6	207	36.8	39.8	36.8	39.8	36.8	37.6	4690	53.5
1975	599.7	206	33.2	36.6	33.2	36.6	33.2	35.5	3817	43.6
1976	801.9	206	44.3	39.1	44.3	39.1	44.3	38.4	5728	65.2
1977	456.9	206	26.4	36.0	26.4	36.0	25.3	35.2	3312	37.8
1978	153.2	206	8.5	30.6	8.5	30.6	8.5	29.9	1537	17.5
1979	1147.3	206	63.6	36.0	63.6	36.0	63.6	35.5	7217	82.4
1980	953.1	206	52.7	38.4	52.7	38.4	52.7	37.9	6346	72.2
1981	441.5	220	22.9	36.4	22.9	36.4	22.9	35.9	3732	42.6
1982	38.2	206	2.1	32.6	2.1	32.6	2.1	32.2	496	5.7
1983	0.0	202	0.0	29.4	0.0	29.4	0.0	29.1	0	0.0
1984	0.0	180	0.0	27.1	0.0	27.1	0.0	26.8	0	0.0
1985	226.2	204	12.7	25.9	12.7	25.9	12.7	25.6	1914	21.8
1986	0.0	207	0.0	23.9	0.0	23.9	0.0	23.6	0	0.0
1987	169.9	207	16.6	23.4	9.4	22.9	9.4	22.6	2555	29.2
1988	376.5	207	25.3	23.5	20.7	22.7	20.7	22.5	5793	65.9
1989	312.8	207	18.7	23.2	17.3	22.4	17.3	22.2	4779	54.6
1990	364.1	192	22.3	23.2	19.4	22.2	21.6	22.1	5789	66.1
1991	197.5	192	74.8	25.9	74.8	25.0	11.7	21.6	2858	32.6
1992	57.7	84	12.2	25.5	12.2	24.7	7.8	21.3	1070	12.2
1993	167.6	84	22.8	25.5	22.8	24.6	22.8	21.3	2435	27.8
1994	2.9	84	2.2	25.0	2.2	24.1	0.4	20.9	195	2.2
1995	0.0	84	0.0	24.5	0.0	23.6	0.0	20.4	0	0.0
1996	0.0	84	0.0	24.0	0.0	23.2	0.0	20.0	0	0.0
1997	264.6	84	39.2	24.3	31.9	23.3	36.0	20.3	2792	31.9
1998	567.4	134	63.8	25.5	62.2	24.5	48.3	21.2	5448	62.2
1999	795.0	134	81.0	27.2	73.6	26.0	67.7	22.6	6443	73.6
2000	681.3	134	57.5	28.1	57.0	26.9	57.9	23.6	5008	57.0
2001	173.2	134	10.5	27.6	10.0	26.4	14.8	23.4	860	9.8
2002	0.0	90	0.0	27.0	0.0	25.9	0.0	22.9	0	0.0
2003	0.0	134	0.0	26.3	0.0	25.2	0.0	22.3	0	0.0
2004	303.8	134	56.8	27.1	56.8	26.1	25.8	22.4	3785	43.1
2005	0.0	90	0.0	26.6	0.0	25.6	0.0	22.0	0	0.0
2006	0.0	90	0.0	26.2	0.0	25.2	0.0	21.6	0	0.0
2007	0.0	90	0.0	25.7	0.0	24.8	0.0	21.3	0	0.0
2008	0.0	90	0.0	25.3	0.0	24.3	0.0	20.9	0	0.0
2009	0.0	90	0.0	24.9	0.0	24.0	0.0	20.6	0	0.0
2010	0.0	90	0.0	24.5	0.0	23.6	0.0	20.3	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					2132	
B. Refuelling without a maintenance					32	
D. Inspection, maintenance or repair without refuelling				2199		
E. Testing of plant systems or components					5	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				1238	18	
H. Nuclear regulatory requirements				272		
J. Grid limitation, failure or grid unavailability					2	94
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				14		42
Z. Others	8760					
Subtotal	8760	0	0	3723	2189	136
Total		8760			6048	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		924
12. Reactor I&C Systems		147
13. Reactor Auxiliary Systems		48
14. Safety Systems		28
15. Reactor Cooling Systems		365
16. Steam generation systems		5
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		401
32. Feedwater and Main Steam System		9
41. Main Generator Systems		85
42. Electrical Power Supply Systems		93
XX. Miscellaneous Systems		6
Total	0	2112

IN-4 RAJASTHAN-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

Contractor: AECL/DAE (ATOMIC ENERGY OF CANADA Ltda AND DEPARTMENT OF ATOMIC ENERGY(INDIA))

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 187.0 MW(e)
 Design Net Capacity: 207.0 MW(e)
 Design Discharge Burnup: 6700 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1449.0 GW(e).h
 Energy Availability Factor: 90.5%
 Load Factor: 88.5%
 Operating Factor: 94.6%
 Energy Unavailability Factor: 9.5%
 Total Off-line Time: 474 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	128.6	128.0	133.0	125.3	103.2	123.0	125.9	105.2	97.3	118.6	126.3	134.8	1449.0
EAF (%)	93.1	96.0	94.6	94.6	83.1	96.6	97.8	80.0	73.4	93.9	93.3	89.6	90.5
UCF (%)	93.1	100.0	100.0	100.0	83.1	100.0	100.0	82.9	74.6	96.6	100.0	100.0	94.2
LF (%)	92.4	101.9	95.6	93.0	74.1	91.3	90.5	75.6	72.3	85.2	93.8	96.9	88.5
OF (%)	90.9	100.0	100.0	100.0	82.1	100.0	100.0	83.7	84.7	94.4	100.0	100.0	94.6
EUf (%)	6.9	4.0	5.4	5.4	16.9	3.4	2.2	20.0	26.6	6.1	6.7	10.4	9.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	0.0	0.0	0.0	1.3
UCLF (%)	6.9	0.0	0.0	0.0	16.9	0.0	0.0	17.1	9.1	3.4	0.0	0.0	4.5
XUF (%)	0.0	4.0	5.4	5.4	0.0	3.4	2.2	2.9	1.2	2.7	6.7	10.4	3.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR AND CAPACITY FACTOR OF 94.59% AND 97.44% RESPECTIVELY. FOR SOME DURATION UNIT OPERATED AT A POWER LEVEL HIGHER THAN RATED POWER LEVEL.

5. Historical Summary

Date of Construction Start: 04 Jan 1968
 Date of First Criticality: 10 Aug 1980
 Date of Grid Connection: 11 Jan 1980
 Date of Commercial Operation: 04 Jan 1981

Lifetime Generation: 23712.0 GW(e).h
 Cumulative Energy Availability Factor: 54.6%
 Cumulative Load Factor: 51.4%
 Cumulative Unit Capability Factor: 58.0%
 Cumulative Energy Unavailability Factor: 45.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	551.9	220	38.4	38.4	38.4	38.4	38.0	38.0	5316	80.5
1982	372.9	206	20.7	28.6	20.7	28.6	20.7	28.4	3651	41.7
1983	957.2	202	54.1	37.6	54.1	37.6	54.1	37.4	6673	76.2
1984	908.7	185	56.1	42.1	49.1	40.4	55.9	42.0	5870	66.8
1985	959.9	184	73.3	48.2	71.3	46.4	59.6	45.4	6243	71.3
1986	1080.5	207	65.2	51.3	59.6	48.8	59.6	47.9	6743	77.0
1987	1031.1	207	63.2	53.1	56.9	50.0	56.9	49.3	6277	71.7
1988	1234.0	207	70.1	55.3	67.9	52.4	67.9	51.8	7935	90.3
1989	1084.2	207	60.5	55.9	59.8	53.3	59.8	52.7	6980	79.7
1990	1173.8	192	68.7	57.2	68.7	54.8	69.8	54.4	7151	81.6
1991	895.1	192	62.9	57.7	62.9	55.5	53.2	54.3	5416	61.8
1992	874.4	184	90.3	60.3	58.1	55.7	54.1	54.3	5297	60.3
1993	1153.5	184	74.2	61.3	71.1	56.8	71.6	55.5	6983	79.7
1994	519.4	184	39.4	59.8	32.2	55.2	32.2	53.9	3244	37.0
1995	0.0	184	0.0	56.0	0.0	51.6	0.0	50.5	0	0.0
1996	0.0	184	0.0	52.6	0.0	48.5	0.0	47.5	0	0.0
1997	0.0	184	0.0	49.7	0.0	45.8	0.0	44.8	0	0.0
1998	512.4	184	49.6	49.7	49.6	46.0	31.8	44.1	3728	42.6
1999	1162.3	184	87.6	51.6	83.1	47.9	72.1	45.5	7264	82.9
2000	1308.1	184	92.3	53.6	92.3	50.0	80.9	47.2	8104	92.3
2001	1348.3	184	86.9	55.1	85.5	51.7	83.6	48.9	7486	85.5
2002	1430.9	187	90.7	56.7	89.0	53.3	87.3	50.6	7768	88.7
2003	1391.5	187	92.3	58.2	84.7	54.7	84.9	52.1	8018	91.5
2004	1047.7	187	77.8	59.0	77.8	55.6	63.8	52.6	6806	77.5
2005	1134.8	187	80.5	59.9	80.0	56.6	69.3	53.2	7581	86.5
2006	1026.8	187	75.9	60.5	70.4	57.1	62.7	53.6	7207	82.3
2007	508.7	187	42.4	59.8	34.0	56.3	31.1	52.8	3758	42.9
2008	0.0	187	0.0	57.7	0.0	54.3	0.0	50.9	0	0.0
2009	470.7	187	31.7	56.8	28.7	53.4	28.7	50.2	2795	31.9
2010	1449.0	187	94.2	58.0	90.5	54.6	88.5	51.4	8286	94.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		295			733	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling				93		
D. Inspection, maintenance or repair without refuelling	109			1324	2	
E. Testing of plant systems or components					12	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				614		14
H. Nuclear regulatory requirements				118	2	1
J. Grid limitation, failure or grid unavailability					26	158
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				43	18	1
L. Human factor related		67				
P. Fire					3	
Z. Others					23	2
Subtotal	109	362	0	2192	824	176
Total		471			3192	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		41
12. Reactor I&C Systems		135
13. Reactor Auxiliary Systems	120	13
14. Safety Systems		25
15. Reactor Cooling Systems	132	84
16. Steam generation systems		11
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries	42	230
32. Feedwater and Main Steam System		41
35. All other I&C Systems		13
41. Main Generator Systems		59
42. Electrical Power Supply Systems		49
XX. Miscellaneous Systems		10
Total	294	712

IN-11 RAJASTHAN-3

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 202.0 MW(e)
 Design Net Capacity: 202.0 MW(e)
 Design Discharge Burnup: 6700 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1282.1 GW(e).h
 Energy Availability Factor: 74.2%
 Load Factor: 72.5%
 Operating Factor: 87.9%
 Energy Unavailability Factor: 25.8%
 Total Off-line Time: 1061 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	90.8	91.4	97.3	93.9	105.7	129.3	139.3	19.0	57.0	153.0	149.5	155.9	1282.1
EAF (%)	65.3	70.3	69.3	70.3	74.8	91.5	94.1	13.4	41.4	100.0	100.0	100.0	74.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	13.9	43.0	100.0	100.0	100.0	88.0
LF (%)	60.4	67.3	64.8	64.6	70.3	88.9	92.7	12.7	39.2	101.8	102.8	103.8	72.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	13.0	42.5	100.0	100.0	100.0	87.9
EUf (%)	34.7	29.7	30.7	29.7	25.2	8.5	5.9	86.6	58.6	0.0	0.0	0.0	25.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86.1	57.0	0.0	0.0	0.0	12.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	34.7	29.7	30.7	29.7	25.2	8.5	5.9	0.5	1.7	0.0	0.0	0.0	13.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR UNIT ACHIEVED THE ANNUAL CAPACITY FACTOR AND AVAILABILITY FACTOR OF 75.38% AND 87.88% RESPECTIVELY. UNIT ACHIEVED 100% AVAILABILITY FACTOR IN ALL THE MONTHS OF YEAR 2010 EXCEPT IN THE MONTH OF AUGUST AND SEPTEMBER.THE BIENNIAL SHUTDOWN OF THE UNIT WAS TAKEN FOR 44 DAYS FROM 5TH AUGUST TO 18TH SEPTEMBER 2010.UNIT OPERATED AT A REDUCED POWER LEVEL OF ABOUT 85% FULL POWER DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 02 Jan 1990 Lifetime Generation: 14359.4 GW(e).h
 Date of First Criticality: 24/12/1999 Cumulative Energy Availability Factor: 72.3%
 Date of Grid Connection: 03 Oct 2000 Cumulative Load Factor: 69.2%
 Date of Commercial Operation: 06 Jan 2000 Cumulative Unit Capability Factor: 88.8%
 Cumulative Energy Unavailability Factor: 27.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	797.7	200	76.4	76.4	76.4	76.4	77.6	77.6	3986	77.6
2001	1366.1	200	84.9	81.7	83.6	80.9	78.0	77.8	7317	83.5
2002	1317.9	202	81.2	81.5	75.5	78.8	74.5	76.5	6715	76.7
2003	1442.1	202	95.3	85.4	84.5	80.4	81.5	77.9	8285	94.6
2004	1260.3	202	90.0	86.4	72.3	78.6	71.0	76.4	7711	87.8
2005	1487.9	202	98.3	88.5	84.6	79.7	84.1	77.8	8581	98.0
2006	985.6	202	83.8	87.8	57.8	76.4	55.7	74.4	7323	83.6
2007	1043.0	202	90.7	88.2	61.1	74.4	58.9	72.4	7934	90.6
2008	952.9	202	87.9	88.1	61.8	72.9	53.7	70.2	7707	87.7
2009	1011.5	202	95.8	88.9	65.5	72.1	57.2	68.8	8338	95.2
2010	1282.1	202	88.0	88.8	74.2	72.3	72.5	69.2	7699	87.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					490	
D. Inspection, maintenance or repair without refuelling	1061			354		
E. Testing of plant systems or components					44	
J. Grid limitation, failure or grid unavailability						61
L. Human factor related					11	
Subtotal	1061	0	0	354	545	61
Total		1061			960	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2000 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		19
12. Reactor I&C Systems		110
13. Reactor Auxiliary Systems		45
15. Reactor Cooling Systems		33
16. Steam generation systems		37
31. Turbine and auxiliaries		59
32. Feedwater and Main Steam System		70
41. Main Generator Systems		36
42. Electrical Power Supply Systems		51
XX. Miscellaneous Systems		5
Total	0	465

IN-12 RAJASTHAN-4

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 202.0 MW(e)
Design Net Capacity: 202.0 MW(e)
Design Discharge Burnup: 6700 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1490.5 GW(e).h
Energy Availability Factor: 84.9%
Load Factor: 84.2%
Operating Factor: 98.2%
Energy Unavailability Factor: 15.1%
Total Off-line Time: 162 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	93.0	92.5	98.7	108.9	105.4	133.3	112.9	146.9	137.3	154.3	150.7	156.8	1490.5
EAF (%)	65.3	70.3	69.3	70.3	74.8	92.4	76.1	100.0	100.0	100.0	100.0	100.0	84.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	78.4	100.0	100.0	100.0	100.0	100.0	98.2
LF (%)	61.9	68.1	65.7	74.8	70.1	91.6	75.1	97.7	94.4	102.7	103.6	104.4	84.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	78.2	100.0	100.0	100.0	100.0	100.0	98.2
EUf (%)	34.7	29.7	30.7	29.7	25.2	7.6	23.9	0.0	0.0	0.0	0.0	0.0	15.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	21.6	0.0	0.0	0.0	0.0	0.0	1.8
XUF (%)	34.7	29.7	30.7	29.7	25.2	7.6	2.3	0.0	0.0	0.0	0.0	0.0	13.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR AND CAPACITY FACTOR OF 98.14% AND 86.86% RESPECTIVELY. UNIT OPERATED AT A REDUCED POWER LEVEL FOR SOME MONTHS DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY.

5. Historical Summary

Date of Construction Start: 10 Jan 1990
Date of First Criticality: 11 Mar 2000
Date of Grid Connection: 17/11/2000
Date of Commercial Operation: 23/12/2000

Lifetime Generation: 13898.0 GW(e).h
Cumulative Energy Availability Factor: 73.2%
Cumulative Load Factor: 70.7%
Cumulative Unit Capability Factor: 91.1%
Cumulative Energy Unavailability Factor: 26.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	54.9	200	54.8	54.8	54.8	54.8	36.9	36.9	410	55.1
2001	1200.8	200	82.0	79.9	71.0	69.7	68.5	66.1	6214	70.9
2002	1671.5	202	96.5	87.9	94.3	81.6	94.5	79.8	8255	94.2
2003	1318.2	202	87.6	87.8	74.8	79.4	74.5	78.0	7633	87.1
2004	1447.7	202	95.8	89.7	79.5	79.4	81.6	78.9	8329	94.8
2005	1461.9	202	92.8	90.3	82.3	80.0	82.6	79.6	8074	92.2
2006	1128.1	202	95.2	91.1	64.1	77.4	63.8	77.0	8334	95.1
2007	943.4	202	81.2	89.7	54.7	74.2	53.3	73.7	7101	81.1
2008	1041.6	202	98.2	90.8	69.0	73.5	58.7	71.8	8626	98.2
2009	859.8	202	86.8	90.3	58.5	71.9	48.6	69.3	7542	86.1
2010	1490.5	202	98.2	91.1	84.9	73.2	84.2	70.7	8598	98.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		162			243	
D. Inspection, maintenance or repair without refuelling				333	4	
E. Testing of plant systems or components					0	
J. Grid limitation, failure or grid unavailability						100
Subtotal	0	162	0	333	247	100
Total		162			680	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems		36
15. Reactor Cooling Systems	162	35
16. Steam generation systems		16
21. Fuel Handling and Storage Facilities		15
31. Turbine and auxiliaries		11
32. Feedwater and Main Steam System		37
41. Main Generator Systems		14
42. Electrical Power Supply Systems		64
Total	162	239

IN-19 RAJASTHAN-5

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 202.0 MW(e)
 Design Net Capacity: 202.0 MW(e)
 Design Discharge Burnup: 7000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1406.2 GW(e).h
 Energy Availability Factor: 85.7%
 Load Factor: 86.8%
 Operating Factor: 89.3%
 Energy Unavailability Factor: 14.3%
 Total Off-line Time: 858 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h		115.0	140.4	72.1	139.6	93.0	103.6	155.0	150.2	126.4	152.7	158.2	1406.2
EAF (%)		85.7	94.4	50.5	93.9	64.9	69.9	100.0	100.0	82.7	100.0	100.0	85.7
UCF (%)		85.7	94.4	50.5	93.9	64.9	69.9	100.0	100.0	82.7	100.0	100.0	85.7
LF (%)		84.7	93.4	49.5	92.9	63.9	68.9	103.1	103.3	84.1	105.0	105.2	86.8
OF (%)		100.0	100.0	57.5	100.0	70.6	71.9	100.0	99.9	82.5	100.0	100.0	89.3
EUf (%)		14.3	5.6	49.5	6.1	35.1	30.1	0.0	0.0	17.3	0.0	0.0	14.3
PUF (%)		0.0	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
UCLF (%)		14.3	5.6	45.9	6.2	35.1	30.1	0.0	0.0	17.3	0.0	0.0	14.0
XUF (%)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THIS UNIT WAS DECLATERD COMMERCIAL ON 4TH FEBRUARY 2010 AND THE DATA IS SUBMITTED FROM THIS DATE. UNIT ACHIEVED AN ANNUAL AVAILABILITY FACTOR AND CAPACITY FACTOR OF 89.47% AND 87.16% RESPECTIVELY. UNIT OPERATED AT MORE THAN 100% RATED POWER LEVEL FOR SOME DURATION.

5. Historical Summary

Date of Construction Start: 18/09/2002
 Date of First Criticality: 24/11/2009
 Date of Grid Connection: 22/12/2009
 Date of Commercial Operation: 02 Apr 2010

Lifetime Generation: 1406.2 GW(e).h
 Cumulative Energy Availability Factor: 85.7%
 Cumulative Load Factor: 86.8%
 Cumulative Unit Capability Factor: 85.7%
 Cumulative Energy Unavailability Factor: 14.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2010	1406.2	202	85.7	85.7	85.7	85.7	86.8	86.8	7158	89.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2010 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External

The reactor has not yet completed a full year of commercial operation.

7. Equipment Related Full Outages, Analysis by System

System	2010	2010 to 2010
	Hours Lost	Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

IN-1 TARAPUR-1

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 150.0 MW(e)
Design Net Capacity: 200.0 MW(e)
Design Discharge Burnup: 21000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 976.8 GW(e).h
Energy Availability Factor: 74.0%
Load Factor: 74.3%
Operating Factor: 77.5%
Energy Unavailability Factor: 26.0%
Total Off-line Time: 1968 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	6.7	99.2	113.1	83.4	100.8	108.5	94.2	111.7	106.0	29.8	9.3	114.0	976.8
EAF (%)	6.0	98.4	100.0	77.2	90.3	100.0	84.4	100.0	98.1	26.7	8.6	100.0	74.0
UCF (%)	6.0	98.4	100.0	77.2	90.3	100.0	84.4	100.0	98.1	26.7	8.6	100.0	74.0
LF (%)	6.0	98.4	101.4	77.2	90.3	100.4	84.4	100.1	98.1	26.7	8.6	102.1	74.3
OF (%)	17.7	100.0	100.0	80.8	93.1	100.0	88.3	100.0	100.0	32.1	20.1	100.0	77.5
EUF (%)	94.0	1.6	0.0	22.8	9.7	0.0	15.6	0.0	1.9	73.3	91.4	0.0	26.0
PUF (%)	0.0	0.0	0.0	22.8	9.7	0.0	0.0	0.0	1.9	73.3	91.4	0.0	16.6
UCLF (%)	94.0	1.6	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0	0.0	0.0	9.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT ACHIEVED AN CAPACITY FACTOR OF 75.73% AND AVAILABILITY FACTOR OF 77.54%.

5. Historical Summary

Date of Construction Start: 10 Jan 1964
Date of First Criticality: 02 Jan 1969
Date of Grid Connection: 04 Jan 1969
Date of Commercial Operation: 28/10/1969
Lifetime Generation: 37139.5 GW(e).h
Cumulative Energy Availability Factor: 67.1%
Cumulative Load Factor: 61.9%
Cumulative Unit Capability Factor: 67.9%
Cumulative Energy Unavailability Factor: 32.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1969			Data not provided								
1970			"								
1971			"								
1972	652.4	210	35.4	35.4	35.4	35.4	35.4	35.4	35.4	5071	57.7
1973	757.1	210	41.2	38.3	41.2	38.3	41.2	38.3	41.2	5181	59.1
1974	832.6	156	60.5	44.3	60.5	44.3	60.9	44.4	6938	79.2	
1975	926.6	200	53.0	46.5	53.0	46.5	52.9	46.6	5825	66.5	
1976	1156.6	210	62.7	50.0	62.7	50.0	62.7	50.0	6717	86.7	
1977	994.8	210	54.1	50.7	54.1	50.7	54.1	50.7	6675	76.2	
1978	941.0	210	51.2	50.8	51.2	50.8	51.2	50.8	6427	73.4	
1979	965.9	210	52.5	51.0	52.5	51.0	52.5	51.0	7143	81.5	
1980	893.9	210	67.8	52.9	67.8	52.9	48.5	50.7	5955	67.8	
1981	793.8	210	68.4	54.5	68.4	54.5	43.2	49.9	5986	68.3	
1982	1112.2	210	89.9	57.8	89.9	57.8	60.5	50.9	7872	89.9	
1983	730.0	200	41.7	56.5	41.7	56.5	41.7	50.2	5396	61.6	
1984	826.9	200	90.3	59.1	89.6	59.0	47.1	49.9	7688	87.5	
1985	790.9	170	64.6	59.4	64.6	59.3	53.2	50.1	6194	70.7	
1986	1090.2	150	84.6	60.7	83.0	60.5	83.0	51.8	7954	90.8	
1987	193.4	150	14.7	58.5	14.7	58.3	14.7	50.0	1533	17.5	
1988	1085.5	150	83.8	59.6	82.4	59.4	82.4	51.5	8010	91.2	
1989	800.3	150	61.6	59.7	61.4	59.5	60.9	51.9	6177	70.5	
1990	1045.2	150	80.5	60.6	80.2	60.4	79.5	53.1	7772	88.7	
1991	566.9	150	82.4	61.5	80.4	61.2	43.1	52.7	6536	74.6	
1992	762.3	150	58.7	61.4	57.9	61.1	57.9	52.9	5487	62.5	
1993	967.7	150	76.9	61.9	74.4	61.6	73.6	53.6	7291	83.2	
1994	280.6	150	22.9	60.5	21.4	60.1	21.4	52.5	2450	28.0	
1995	1092.3	150	91.0	61.6	83.1	60.9	83.1	53.5	7893	90.1	
1996	403.3	150	32.3	60.6	30.6	59.9	30.6	52.8	3872	44.1	
1997	985.5	150	75.9	61.1	75.0	60.4	75.0	53.5	7347	83.9	
1998	1162.6	150	92.8	62.1	91.6	61.4	88.5	54.6	8283	94.6	
1999	852.6	150	67.9	62.3	67.0	61.5	64.9	54.9	6405	73.1	
2000	1181.1	150	91.6	63.1	91.6	62.4	89.6	55.9	8337	94.9	
2001	1084.2	150	84.3	63.8	83.6	63.0	82.5	56.7	7635	87.2	
2002	1180.7	150	93.8	64.6	92.0	63.9	89.9	57.6	8394	95.8	
2003	1100.4	150	86.9	65.2	85.2	64.4	83.7	58.3	7901	90.2	
2004	1148.6	150	90.9	65.9	89.0	65.1	87.2	59.1	8111	92.3	
2005	965.0	150	74.2	66.1	74.2	65.3	73.4	59.5	6552	74.8	
2006	938.7	150	71.9	66.2	71.4	65.5	71.4	59.8	6652	75.9	
2007	1218.3	150	93.6	66.9	92.7	66.1	92.7	60.6	8400	95.9	
2008	964.8	150	80.2	67.2	78.2	66.4	73.2	60.9	7045	80.2	
2009	1205.6	150	88.2	67.7	88.2	66.9	91.8	61.6	7752	88.5	
2010	976.8	150	74.0	67.9	74.0	67.1	74.3	61.9	6792	77.5	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		612			329	1
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1080			1288	18	
D. Inspection, maintenance or repair without refuelling	189			209	0	
E. Testing of plant systems or components		86		8		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				83		
J. Grid limitation, failure or grid unavailability					0	47
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	1	3
Subtotal	1269	698	0	1588	348	51
Total		1967			1987	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		11
13. Reactor Auxiliary Systems		1
14. Safety Systems		1
15. Reactor Cooling Systems		53
16. Steam generation systems		17
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		148
32. Feedwater and Main Steam System	612	59
41. Main Generator Systems		0
42. Electrical Power Supply Systems		30
XX. Miscellaneous Systems		0
Total	612	324

IN-2 TARAPUR-2

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF)
at the beginning of 2010: 150.0 MW(e)
Design Net Capacity: 200.0 MW(e)
Design Discharge Burnup: 21000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1309.3 GW(e).h
Energy Availability Factor: 98.9%
Load Factor: 99.6%
Operating Factor: 100.0%
Energy Unavailability Factor: 1.1%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	118.0	100.8	113.3	108.6	109.7	106.4	111.1	109.3	105.3	109.3	109.4	108.0	1309.3
EAF (%)	100.0	100.0	100.0	100.0	98.3	98.5	99.5	98.0	97.5	97.9	100.0	96.8	98.9
UCF (%)	100.0	100.0	100.0	100.0	98.3	98.5	99.6	98.0	97.6	97.9	100.0	96.8	98.9
LF (%)	105.8	100.0	101.5	100.6	98.3	98.5	99.5	98.0	97.5	97.9	101.3	96.8	99.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	1.7	1.5	0.5	2.0	2.5	2.1	0.0	3.3	1.1
PUF (%)	0.0	0.0	0.0	0.0	1.7	1.5	0.5	2.0	2.5	2.1	0.0	3.3	1.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT ACHIEVED A CAPACITY FACTOR OF 99.46% AND AN AVAILABILITY FACTOR OF 100%. THIS UNIT HAS BEEN OPERATING SINCE 22ND JULY 2009 AND HAS COMPLETED 528 DAYS OF CONTINUOUS OPERATION TILL 31 DECEMBER 2010 AND IS STILL OPERATING.

5. Historical Summary

Date of Construction Start: 10 Jan 1964
Date of First Criticality: 28/02/1969
Date of Grid Connection: 05 May 1969
Date of Commercial Operation: 28/10/1969

Lifetime Generation: 37910.4 GW(e).h
Cumulative Energy Availability Factor: 66.7%
Cumulative Load Factor: 62.6%
Cumulative Unit Capability Factor: 67.4%
Cumulative Energy Unavailability Factor: 33.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1969			Data not provided							
1970			"							
1971			"							
1972	218.0	210	11.8	11.8	11.8	11.8	11.8	11.8	1987	22.6
1973	1249.6	210	67.9	39.8	67.9	39.8	67.9	39.8	7402	84.5
1974	597.0	194	35.2	38.4	35.0	38.3	35.1	38.3	4016	45.8
1975	925.8	200	52.8	41.9	52.8	41.9	52.8	41.9	5654	64.5
1976	1137.9	210	61.7	46.0	61.7	45.9	61.7	46.0	6534	74.4
1977	1161.5	210	68.2	49.7	68.2	49.7	63.1	48.9	7650	87.3
1978	1146.1	210	62.3	51.6	62.3	51.6	62.3	50.8	6678	76.2
1979	993.0	210	53.9	51.9	53.9	51.8	54.0	51.2	6216	71.0
1980	899.9	210	78.4	54.9	78.4	54.8	48.8	51.0	6883	78.4
1981	964.0	210	77.1	57.1	77.1	57.1	52.4	51.1	6748	77.0
1982	556.7	210	55.4	56.9	55.4	56.9	30.3	49.2	4844	55.3
1983	867.7	200	49.5	56.4	49.5	56.3	49.5	49.2	7519	85.8
1984	803.1	200	70.6	57.4	69.6	57.3	45.7	49.0	5615	63.9
1985	1070.9	170	83.4	59.0	83.4	58.9	72.0	50.3	8059	92.0
1986	769.5	150	58.9	59.0	58.6	58.9	58.6	50.7	5615	64.1
1987	1167.2	150	91.5	60.5	88.8	60.3	88.8	52.5	8221	93.8
1988	813.5	150	62.1	60.6	61.7	60.4	61.7	53.0	6077	69.2
1989	427.1	150	34.8	59.5	34.8	59.2	32.5	52.1	3052	34.8
1990	762.4	150	58.7	59.4	58.7	59.2	58.0	52.3	7827	89.3
1991	848.5	150	76.4	60.1	75.0	59.9	64.6	52.8	6265	71.5
1992	819.8	150	62.8	60.2	62.2	60.0	62.2	53.2	6076	69.2
1993	779.7	150	60.7	60.2	59.3	59.9	59.3	53.4	5750	65.6
1994	843.6	150	64.9	60.4	64.2	60.1	64.2	53.8	6722	76.7
1995	640.0	150	55.6	60.2	48.7	59.7	48.7	53.6	4911	56.1
1996	361.2	150	30.4	59.2	27.4	58.6	27.4	52.7	3203	36.5
1997	775.7	150	59.6	59.2	59.0	58.6	59.0	52.9	6978	79.7
1998	881.1	150	71.2	59.6	67.8	58.9	67.1	53.4	6522	74.5
1999	1103.5	150	87.6	60.5	86.4	59.7	84.0	54.3	7711	88.0
2000	1023.1	150	79.0	61.0	79.0	60.3	77.6	55.0	7162	81.5
2001	1197.4	150	93.9	62.0	93.3	61.2	91.1	56.0	8364	95.5
2002	1163.3	150	90.8	62.8	90.2	62.1	88.5	56.9	7978	91.1
2003	1117.1	150	86.1	63.4	85.9	62.7	85.0	57.7	7890	90.1
2004	1238.3	150	95.2	64.2	94.5	63.5	94.0	58.6	8455	96.3
2005	893.3	150	70.7	64.4	68.9	63.7	68.0	58.9	6359	72.6
2006	1090.9	150	83.9	64.9	82.7	64.1	83.0	59.5	7439	84.9
2007	1142.4	150	87.2	65.4	86.5	64.7	86.9	60.2	7812	89.2
2008	1265.0	150	97.3	66.2	95.8	65.4	96.0	61.0	8462	96.3
2009	1201.4	150	88.6	66.7	88.1	66.0	91.4	61.7	7878	89.9
2010	1309.3	150	98.9	67.4	98.9	66.7	99.6	62.6	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					515	2
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				1268		
D. Inspection, maintenance or repair without refuelling				192		
E. Testing of plant systems or components				2	3	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				56		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				28		
H. Nuclear regulatory requirements					6	
J. Grid limitation, failure or grid unavailability						37
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	14
Subtotal	0	0	0	1546	526	53
Total		0			2125	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		18
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		44
14. Safety Systems		4
15. Reactor Cooling Systems		74
16. Steam generation systems		14
31. Turbine and auxiliaries		64
32. Feedwater and Main Steam System		58
41. Main Generator Systems		101
42. Electrical Power Supply Systems		110
XX. Miscellaneous Systems		11
Total	0	502

IN-23 TARAPUR-3

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 490.0 MW(e)
 Design Net Capacity: 502.0 MW(e)
 Design Discharge Burnup: 7000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2794.0 GW(e).h
 Energy Availability Factor: 65.1%
 Load Factor: 65.1%
 Operating Factor: 91.0%
 Energy Unavailability Factor: 34.9%
 Total Off-line Time: 788 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	239.4	167.5	243.1	225.7	135.1	226.5	184.7	267.6	277.5	218.8	281.4	326.8	2794.0
EAF (%)	65.7	50.9	66.7	64.0	37.1	64.2	50.7	73.4	78.7	60.0	79.8	89.6	65.1
UCF (%)	100.0	77.1	100.0	100.0	62.7	99.0	76.4	100.0	100.0	76.8	100.0	100.0	91.0
LF (%)	65.7	50.9	66.7	64.0	37.1	64.2	50.7	73.4	78.7	60.0	79.8	89.6	65.1
OF (%)	100.0	77.1	100.0	100.0	62.6	98.9	76.3	100.0	100.0	76.9	100.0	100.0	91.0
EUF (%)	34.3	49.1	33.3	36.0	62.9	35.8	49.3	26.6	21.3	40.0	20.2	10.4	34.9
PUF (%)	0.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	0.0	23.2	0.0	0.0	3.5
UCLF (%)	0.0	23.0	0.0	0.0	19.4	1.0	23.6	0.0	0.0	0.0	0.0	0.0	5.5
XUF (%)	34.3	26.2	33.3	36.0	25.6	34.8	25.7	26.6	21.3	16.8	20.2	10.4	25.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN THIS YEAR UNIT ACHIEVED A CAPACITY FACTOR AND AVAILABILITY FACTOR OF 66.7% AND 91.01% RESPECTIVELY. UNIT OPERATED AT A REDUCED POWER LEVEL DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY AS FOLLOWS: JANUARY TO JULY 2010 - 70% FULL POWER AUGUST 2010 - 75% FULL POWER SEPTEMBER TO NOVEMBER 2010 - 80% FULL POWER DECEMBER 2010 - 90% FULL POWER

5. Historical Summary

Date of Construction Start: 05 Dec 2000
 Date of First Criticality: 21/05/2006
 Date of Grid Connection: 15/06/2006
 Date of Commercial Operation: 18/08/2006

Lifetime Generation: 10125.2 GW(e).h
 Cumulative Energy Availability Factor: 57.8%
 Cumulative Load Factor: 52.7%
 Cumulative Unit Capability Factor: 87.8%
 Cumulative Energy Unavailability Factor: 42.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2006	909.1	490	66.0	66.0	47.5	47.5	50.5	50.5	2523	68.7
2007	2482.8	490	92.1	84.4	66.2	60.7	57.8	55.7	7967	90.9
2008	1594.4	490	85.6	84.9	44.3	53.9	37.0	48.0	7465	85.0
2009	2225.0	490	91.6	86.8	60.1	55.7	51.8	49.1	8022	91.6
2010	2794.0	490	91.0	87.8	65.1	57.8	65.1	52.7	7972	91.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		388			498	
D. Inspection, maintenance or repair without refuelling	133			258		
E. Testing of plant systems or components	172	93				
J. Grid limitation, failure or grid unavailability						30
L. Human factor related					11	
P. Fire					4	
Subtotal	305	481	0	258	513	30
Total		786			801	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
	12. Reactor I&C Systems	154
14. Safety Systems		27
15. Reactor Cooling Systems	50	104
31. Turbine and auxiliaries	183	148
32. Feedwater and Main Steam System		29
33. Circulating Water System		16
41. Main Generator Systems		33
Total	387	496

IN-24 TARAPUR-4

Operator: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)
Contractor: NPCIL (NUCLEAR POWER CORPORATION OF INDIA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP) at the beginning of 2010: 490.0 MW(e)
Design Net Capacity: 502.0 MW(e)
Design Discharge Burnup: 7000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2571.8 GW(e).h
Energy Availability Factor: 59.9%
Load Factor: 59.9%
Operating Factor: 85.9%
Energy Unavailability Factor: 40.1%
Total Off-line Time: 1234 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	166.9	223.1	248.0	143.5	236.3	213.7	65.6	234.5	261.4	285.7	256.0	237.1	2571.8
EAF (%)	45.8	67.8	68.0	40.7	64.8	60.6	18.0	64.3	74.1	78.4	72.6	65.0	59.9
UCF (%)	72.2	100.0	100.0	67.5	100.0	90.8	30.0	93.4	100.0	100.0	95.2	83.5	85.9
LF (%)	45.8	67.8	68.0	40.7	64.8	60.6	18.0	64.3	74.1	78.4	72.6	65.0	59.9
OF (%)	72.2	100.0	100.0	67.5	100.0	90.8	30.1	93.3	100.0	100.0	95.3	83.5	85.9
EUF (%)	54.2	32.2	32.0	59.3	35.2	39.4	82.0	35.7	25.9	21.6	27.4	35.0	40.1
PUF (%)	20.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	16.5	3.5
UCLF (%)	7.2	0.0	0.0	32.5	0.0	9.2	70.0	6.6	0.0	0.0	0.0	0.0	10.5
XUF (%)	26.4	32.2	32.0	26.8	35.2	30.2	12.0	29.1	25.9	21.6	22.7	18.4	26.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT ACHIEVED AN ANNUAL CAPACITY FACTOR AND AVAILABILITY FACTOR OF 61.5% AND 85.9% RESPECTIVELY. THIS UNIT OPERATED AT A REDUCED POWER LEVEL DUE TO MISMATCH IN FUEL DEMAND AND SUPPLY AS FOLLOWS; JANUARY TO JULY 2010 - 70% FULL POWER AUGUST 2010 - 73% FULL POWER SEPTEMBER 2010 - 77% FULL POWER OCTOBER TO DECEMBER 2010 - 80% FULL POWER

5. Historical Summary

Date of Construction Start: 03 Aug 2000
Date of First Criticality: 03 Jun 2005
Date of Grid Connection: 06 Apr 2005
Date of Commercial Operation: 09 Dec 2005

Lifetime Generation: 11308.4 GW(e).h
Cumulative Energy Availability Factor: 53.5%
Cumulative Load Factor: 49.1%
Cumulative Unit Capability Factor: 82.6%
Cumulative Energy Unavailability Factor: 46.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2005	942.8	490	77.4	77.4	73.8	73.8	65.7	65.7	2227	76.0
2006	1762.1	490	65.2	68.3	39.0	47.7	41.1	47.2	5454	62.3
2007	2033.0	490	78.5	72.7	54.4	50.6	47.4	47.3	6797	77.6
2008	1709.8	490	91.3	78.3	47.4	49.6	39.7	45.0	8022	91.3
2009	2229.3	490	93.5	81.8	60.0	52.0	51.9	46.6	8187	93.5
2010	2571.8	490	85.9	82.6	59.9	53.5	59.9	49.1	7526	85.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2005 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		924			796	
D. Inspection, maintenance or repair without refuelling	310			303		
E. Testing of plant systems or components				0	82	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				119		
J. Grid limitation, failure or grid unavailability						78
L. Human factor related					18	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						69
Z. Others					9	
Subtotal	310	924	0	422	905	147
Total		1234			1474	

7. Equipment Related Full Outages, Analysis by System

System	2010	2005 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	234	13
12. Reactor I&C Systems	53	298
15. Reactor Cooling Systems		20
21. Fuel Handling and Storage Facilities	586	65
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System	49	1
33. Circulating Water System		43
35. All other I&C Systems		0
41. Main Generator Systems		188
42. Electrical Power Supply Systems		123
XX. Miscellaneous Systems		21
Total	922	792

JP-5 FUKUSHIMA-DAIICHI-1

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
Contractor: GE/GETSC (GENERAL ELECTRIC CO. / GENERAL ELECTRIC TECHNICAL SERVICES CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 439.0 MW(e)
Design Net Capacity: 439.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2089.0 GW(e).h
Energy Availability Factor: 55.0%
Load Factor: 54.3%
Operating Factor: 55.7%
Energy Unavailability Factor: 45.0%
Total Off-line Time: 3884 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	325.2	293.6	248.7	0.0	0.0	0.0	19.7	212.2	27.7	322.8	314.4	324.8	2089.0
EAF (%)	100.0	100.0	76.9	0.0	0.0	0.0	8.6	67.0	9.8	99.2	99.8	100.0	55.0
UCF (%)	100.0	100.0	76.9	0.0	0.0	0.0	8.6	67.2	9.8	100.0	100.0	100.0	55.1
LF (%)	99.6	99.5	76.1	0.0	0.0	0.0	6.0	65.0	8.8	98.8	99.5	99.5	54.3
OF (%)	100.0	100.0	77.4	0.0	0.0	0.0	11.6	67.7	11.9	100.0	100.0	100.0	55.7
EUf (%)	0.0	0.0	23.1	100.0	100.0	100.0	91.4	33.0	90.2	0.8	0.2	0.0	45.0
PUf (%)	0.0	0.0	23.1	100.0	100.0	100.0	33.4	0.0	1.1	0.0	0.0	0.0	29.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	58.0	32.8	89.1	0.0	0.0	0.0	15.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.8	0.2	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/07/1967
Date of First Criticality: 10 Oct 1970
Date of Grid Connection: 17/11/1970
Date of Commercial Operation: 26/03/1971

Lifetime Generation: 81618.0 GW(e).h
Cumulative Energy Availability Factor: 54.0%
Cumulative Load Factor: 53.3%
Cumulative Unit Capability Factor: 54.0%
Cumulative Energy Unavailability Factor: 46.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	1941.0	460	61.5	61.5	61.5	61.5	57.5	57.5	4738	64.5
1972	2589.1	460	66.4	64.2	66.4	64.2	64.1	61.1	5878	66.9
1973	2216.8	460	58.9	62.3	58.9	62.3	55.0	58.9	5469	62.4
1974	1629.7	439	47.0	58.5	47.0	58.5	42.4	54.8	4934	56.3
1975	0.0	439	0.0	46.7	0.0	46.7	0.0	43.8	5	0.1
1976	1563.9	439	40.5	45.7	40.5	45.7	40.6	43.2	4548	51.8
1977	0.0	439	0.0	39.1	0.0	39.1	0.0	37.0	0	0.0
1978	1497.6	439	38.9	39.1	38.9	39.1	38.9	37.3	4461	50.9
1979	2504.4	439	65.1	42.0	65.1	42.0	65.1	40.4	6626	75.6
1980	1249.5	439	32.4	41.1	32.4	41.1	32.4	39.6	3323	37.8
1981	1084.8	439	28.1	39.9	28.1	39.9	28.2	38.5	2915	33.3
1982	2355.0	439	61.0	41.6	61.0	41.6	61.2	40.4	5741	65.5
1983	3019.5	439	78.5	44.5	78.5	44.5	78.5	43.4	7384	84.3
1984	2669.8	439	69.5	46.3	69.5	46.3	69.2	45.2	6222	70.8
1985	1699.3	439	44.4	46.2	44.4	46.2	44.2	45.2	4005	45.7
1986	2524.7	439	66.1	47.4	66.1	47.4	65.7	46.4	5836	66.6
1987	3308.9	439	87.8	49.8	87.3	49.7	86.0	48.8	7727	88.2
1988	2794.5	439	72.8	51.1	72.8	51.0	72.5	50.1	6431	73.2
1989	1440.8	439	38.6	50.4	38.6	50.4	37.5	49.4	3457	39.5
1990	2352.4	439	61.4	51.0	61.4	50.9	61.2	50.0	5487	62.6
1991	1280.0	439	33.4	50.1	33.4	50.1	33.3	49.2	2985	34.1
1992	1794.1	439	46.9	50.0	46.9	49.9	46.5	49.1	4166	47.4
1993	2500.7	439	65.5	50.7	65.4	50.6	65.0	49.8	5811	66.3
1994	3337.5	439	87.2	52.2	87.2	52.1	86.8	51.3	7667	87.5
1995	3030.8	439	79.3	53.3	79.3	53.2	78.8	52.4	6977	79.6
1996	2298.6	439	60.0	53.5	60.0	53.5	59.6	52.7	5276	60.1
1997	3258.9	439	85.0	54.7	85.0	54.7	84.7	53.9	7445	85.0
1998	3287.2	439	86.2	55.8	85.9	55.8	85.5	55.0	7581	86.5
1999	2556.9	439	67.0	56.2	67.0	56.2	66.5	55.4	5876	67.1
2000	3706.3	439	96.9	57.6	96.9	57.5	96.1	56.8	8517	97.0
2001	487.5	439	12.9	56.1	12.9	56.1	12.7	55.4	1131	12.9
2002	3120.2	439	81.6	56.9	81.6	56.9	81.1	56.2	7146	81.6
2003	0.0	439	0.0	55.2	0.0	55.2	0.0	54.5	0	0.0
2004	0.0	439	0.0	53.6	0.0	53.5	0.0	52.9	0	0.0
2005	851.3	439	22.6	52.7	22.6	52.7	22.1	52.0	2050	23.4
2006	3714.6	439	97.2	53.9	97.1	53.9	96.6	53.2	8664	98.9
2007	610.8	439	15.9	52.9	15.9	52.9	15.9	52.2	1412	16.1
2008	3036.6	439	79.4	53.6	79.2	53.6	78.7	52.9	6984	79.5
2009	2637.4	439	69.4	54.0	69.1	54.0	68.6	53.3	6206	70.8
2010	2089.0	439	55.1	54.0	55.0	54.0	54.3	53.3	4876	55.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1308			639	
C. Inspection, maintenance or repair combined with refuelling	2598			2869		
D. Inspection, maintenance or repair without refuelling				77		
H. Nuclear regulatory requirements					9	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					37	
Z. Others					98	
Subtotal	2598	1308	0	2946	783	0
Total		3906			3729	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	434	
12. Reactor I&C Systems		63
13. Reactor Auxiliary Systems		244
14. Safety Systems		5
15. Reactor Cooling Systems		8
31. Turbine and auxiliaries	874	9
32. Feedwater and Main Steam System		49
41. Main Generator Systems		25
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems		0
Total	1308	406

JP-9 FUKUSHIMA-DAIICHI-2

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: GE/T (GENERAL ELECTRIC CO. / TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 760.0 MW(e)
 Design Net Capacity: 760.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4790.3 GW(e).h
 Energy Availability Factor: 72.0%
 Load Factor: 72.0%
 Operating Factor: 74.1%
 Energy Unavailability Factor: 28.0%
 Total Off-line Time: 2267 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	565.4	412.6	565.4	547.2	565.4	303.1	220.7	564.9	269.5	0.0	208.3	567.6	4790.3
EAF (%)	100.0	80.8	100.0	100.0	100.0	55.4	39.0	99.9	49.3	0.0	39.5	100.0	72.0
UCF (%)	100.0	80.8	100.0	100.0	100.0	55.4	39.0	100.0	49.4	0.0	39.5	100.0	72.1
LF (%)	100.0	80.8	100.0	100.0	100.0	55.4	39.0	99.9	49.2	0.0	38.1	100.4	72.0
OF (%)	100.0	100.0	100.0	100.0	100.0	55.4	41.0	100.0	50.0	0.0	44.0	100.0	74.1
EUf (%)	0.0	19.2	0.0	0.0	0.0	44.6	61.0	0.1	50.7	100.0	60.5	0.0	28.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	50.6	100.0	60.5	0.0	17.6
UCLF (%)	0.0	19.2	0.0	0.0	0.0	44.6	61.0	0.0	0.0	0.0	0.0	0.0	10.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 06 Sep 1969
 Date of First Criticality: 05 Oct 1973
 Date of Grid Connection: 24/12/1973
 Date of Commercial Operation: 18/07/1974

Lifetime Generation: 146892.0 GW(e).h
 Cumulative Energy Availability Factor: 61.7%
 Cumulative Load Factor: 60.9%
 Cumulative Unit Capability Factor: 61.8%
 Cumulative Energy Unavailability Factor: 38.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	2591.9	760	83.0	83.0	77.2	77.2	77.2	77.2	3739	84.7
1975	622.1	760	11.2	35.3	11.2	33.3	9.3	32.1	982	11.2
1976	4191.4	760	62.8	46.3	62.8	45.1	62.8	44.4	6918	78.8
1977	49.7	760	0.7	33.3	0.7	32.5	0.7	31.9	96	1.1
1978	3876.3	760	58.2	38.8	58.2	38.2	58.2	37.8	6538	74.6
1979	2976.0	760	44.7	39.9	44.7	39.4	44.7	39.0	4752	54.2
1980	2889.0	760	43.3	40.4	43.3	40.0	43.3	39.7	4619	52.6
1981	3841.8	760	57.8	42.7	57.8	42.3	57.7	42.1	5794	66.1
1982	5290.2	760	79.4	47.0	79.4	46.7	79.5	46.5	7531	86.0
1983	3422.7	760	51.4	47.5	51.4	47.2	51.4	47.0	4934	56.3
1984	3698.7	760	56.0	48.3	56.0	48.0	55.4	47.8	5069	57.7
1985	4266.3	760	65.1	49.8	65.1	49.5	64.1	49.2	5952	67.9
1986	5541.1	760	84.3	52.5	84.3	52.3	83.2	51.9	7478	85.4
1987	3851.1	760	58.6	53.0	58.6	52.8	57.8	52.4	5260	60.0
1988	4101.3	760	62.3	53.6	62.3	53.4	61.4	53.0	5724	65.2
1989	6516.4	760	100.0	56.6	100.0	56.4	97.9	55.9	8760	100.0
1990	3122.8	760	47.6	56.1	47.6	55.9	46.9	55.3	4385	50.1
1991	3853.1	760	59.3	56.2	59.3	56.1	57.9	55.5	5291	60.4
1992	4568.5	760	69.8	57.0	69.7	56.8	68.4	56.2	6261	71.3
1993	4186.7	760	64.3	57.4	64.3	57.2	62.9	56.5	5659	64.6
1994	2266.0	760	36.0	56.3	34.7	56.1	34.0	55.4	3138	35.8
1995	6396.5	760	97.2	58.2	97.2	58.0	96.1	57.3	8520	97.3
1996	5192.3	760	78.8	59.1	78.8	58.9	77.8	58.2	6948	79.1
1997	4618.9	760	70.3	59.6	70.3	59.4	69.4	58.7	6197	70.7
1998	3976.2	760	60.9	59.7	60.6	59.5	59.7	58.7	5352	61.1
1999	3158.4	760	48.1	59.2	48.1	59.0	47.4	58.3	4216	48.1
2000	5167.2	760	78.6	59.9	78.6	59.8	77.4	59.0	6904	78.6
2001	5996.5	760	91.3	61.1	91.3	60.9	90.1	60.2	8036	91.7
2002	5101.0	760	77.8	61.7	77.8	61.5	76.6	60.7	6815	77.8
2003	1601.1	760	24.3	60.4	24.3	60.2	24.0	59.5	2136	24.4
2004	3671.5	760	55.7	60.2	55.7	60.1	55.0	59.3	4949	56.3
2005	3424.9	760	52.2	60.0	52.2	59.8	51.4	59.1	4735	54.1
2006	3219.5	760	49.2	59.7	49.1	59.5	48.4	58.8	4447	50.8
2007	5879.9	760	89.4	60.5	89.4	60.4	88.3	59.6	7891	90.1
2008	5289.6	760	80.5	61.1	80.5	61.0	79.2	60.2	7101	80.8
2009	4903.3	760	74.9	61.5	74.9	61.4	73.6	60.6	6592	75.3
2010	4790.3	760	72.1	61.8	72.0	61.7	72.0	60.9	6493	74.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		760			246	
B. Refuelling without a maintenance					41	
C. Inspection, maintenance or repair combined with refuelling	1526			2538		
D. Inspection, maintenance or repair without refuelling				112		
H. Nuclear regulatory requirements						13
J. Grid limitation, failure or grid unavailability						2
L. Human factor related					17	
Z. Others					49	
Subtotal	1526	760	0	2650	353	15
Total		2286			3018	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		98
13. Reactor Auxiliary Systems		6
14. Safety Systems		6
15. Reactor Cooling Systems		55
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		36
33. Circulating Water System		3
42. Electrical Power Supply Systems	760	4
Total	760	242

JP-10 FUKUSHIMA-DAIICHI-3

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 760.0 MW(e)
 Design Net Capacity: 760.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4854.0 GW(e).h
 Energy Availability Factor: 73.2%
 Load Factor: 72.9%
 Operating Factor: 73.9%
 Energy Unavailability Factor: 26.8%
 Total Off-line Time: 2287 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	566.0	511.3	565.8	547.3	564.3	321.9	0.0	0.0	105.3	559.6	544.8	567.7	4854.0
EAF (%)	100.0	100.0	100.0	100.0	99.8	59.4	0.0	0.0	21.3	100.0	100.0	100.0	73.2
UCF (%)	100.0	100.0	100.0	100.0	99.8	59.5	0.0	0.0	21.3	100.0	100.0	100.0	73.2
LF (%)	100.1	100.1	100.1	100.0	99.8	58.8	0.0	0.0	19.2	99.0	99.6	100.4	72.9
OF (%)	100.0	100.0	100.0	100.0	100.0	60.0	0.0	0.0	29.0	100.0	100.0	100.0	73.9
EUF (%)	0.0	0.0	0.0	0.0	0.2	40.6	100.0	100.0	78.7	0.0	0.0	0.0	26.8
PUF (%)	0.0	0.0	0.0	0.0	0.2	40.6	100.0	100.0	78.7	0.0	0.0	0.0	26.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

ON AUGUST 16-21,32 MOX FUEL ASSEMBLIES WERE LOADED DURING A PERIODIC INSPECTION. ON SEPTEMBER 23,THE UNIT RESTARTED GENERATION OF ELECTRICITY AND ON OCTORBER 26,STARTED COMMERCIAL OPERATION. FUKUSHIMA-I-3 IS THE THIRD REACTOR IN JAPAN TO USE MOX FUEL AND THE FIRST BOILING WATER REACTOR (BWR) TO DO SO.

5. Historical Summary

Date of Construction Start: 28/12/1970
 Date of First Criticality: 09 Jun 1974
 Date of Grid Connection: 26/10/1974
 Date of Commercial Operation: 27/03/1976
 Lifetime Generation: 154663.0 GW(e).h
 Cumulative Energy Availability Factor: 65.8%
 Cumulative Load Factor: 65.5%
 Cumulative Unit Capability Factor: 65.9%
 Cumulative Energy Unavailability Factor: 34.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	4441.7	784	80.2	80.2	80.2	80.2	77.1	77.1	6807	92.7
1977	2171.1	760	32.6	54.7	32.6	54.7	53.3	53.3	3575	40.8
1978	2753.7	760	41.4	50.0	41.4	50.0	41.4	49.1	4368	49.9
1979	4916.3	760	73.9	56.2	73.9	56.2	73.8	55.5	7190	82.1
1980	4287.0	760	64.2	57.9	64.2	57.9	64.2	57.3	6110	69.6
1981	3722.8	760	55.9	57.5	55.9	57.5	55.9	57.1	5173	59.1
1982	2886.8	760	42.8	55.4	42.8	55.4	43.4	55.1	4037	46.1
1983	4034.0	760	60.6	56.0	60.6	56.0	60.6	55.8	5643	64.4
1984	4497.3	760	67.7	57.4	67.7	57.4	67.4	57.1	6041	68.8
1985	5798.6	760	87.7	60.4	87.7	60.4	87.1	60.1	7738	88.3
1986	4234.2	760	63.5	60.7	63.5	60.7	63.6	60.4	5621	64.2
1987	3748.8	760	57.4	60.4	56.7	60.4	56.3	60.1	5086	58.1
1988	5123.0	760	77.0	61.7	77.0	61.7	76.7	61.4	6822	77.7
1989	5706.7	760	86.2	63.5	86.2	63.4	85.7	63.1	7616	86.9
1990	2919.5	760	44.3	62.2	44.3	62.2	43.9	61.8	3985	45.5
1991	4491.0	760	68.0	62.6	68.0	62.5	67.5	62.2	6003	68.5
1992	6098.7	760	92.0	64.3	92.0	64.3	91.4	63.9	8120	92.4
1993	4204.3	760	63.7	64.3	63.7	64.2	63.2	63.9	5655	64.6
1994	4202.3	760	63.6	64.2	63.6	64.2	63.1	63.8	5647	64.5
1995	5966.5	760	90.2	65.5	90.2	65.5	89.6	65.1	8036	91.7
1996	4909.7	760	73.9	65.9	73.9	65.9	73.5	65.5	6525	74.3
1997	2516.7	760	38.1	64.7	38.1	64.6	37.8	64.3	3345	38.2
1998	2632.7	760	42.2	63.7	42.2	63.7	39.5	63.2	3622	41.3
1999	5116.1	760	77.4	64.3	77.3	64.2	76.8	63.8	6792	77.5
2000	5932.5	760	89.5	65.3	89.4	65.2	88.9	64.8	7859	89.5
2001	5637.3	760	85.6	66.1	85.5	66.0	84.7	65.6	7506	85.7
2002	3567.3	760	54.1	65.6	54.0	65.6	53.6	65.1	4747	54.2
2003	2483.6	760	37.6	64.6	37.6	64.6	37.3	64.1	3290	37.6
2004	3969.7	760	59.5	64.4	59.5	64.4	59.5	63.9	5225	59.5
2005	5103.9	760	76.1	64.8	76.1	64.8	76.7	64.4	6987	79.8
2006	4081.9	760	61.8	64.7	61.8	64.7	61.3	64.3	5509	62.9
2007	4312.8	760	65.3	64.7	65.0	64.7	64.8	64.3	5840	66.7
2008	6668.8	760	100.0	65.8	100.0	65.8	99.9	65.4	8784	100.0
2009	4037.6	760	60.9	65.7	60.9	65.6	60.6	65.2	5380	61.4
2010	4854.0	760	73.2	65.9	73.2	65.8	72.9	65.5	6473	73.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					298	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	2304			2406		
D. Inspection, maintenance or repair without refuelling				32		
E. Testing of plant systems or components				21		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	0
Z. Others					7	
Subtotal	2304	0	0	2459	305	0
Total		2304			2764	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1976 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
12. Reactor I&C Systems			169
13. Reactor Auxiliary Systems			4
15. Reactor Cooling Systems			94
31. Turbine and auxiliaries			27
42. Electrical Power Supply Systems			2
Total	0		296

JP-16 FUKUSHIMA-DAIICHI-4

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 760.0 MW(e)
Design Net Capacity: 760.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6040.8 GW(e).h
Energy Availability Factor: 91.0%
Load Factor: 90.7%
Operating Factor: 91.2%
Energy Unavailability Factor: 9.0%
Total Off-line Time: 768 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	565.0	509.0	563.7	548.0	566.1	546.3	562.9	562.4	539.6	560.3	517.4	0.0	6040.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.8	99.5	99.7	95.2	0.0	91.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.8	96.1	0.0	91.1
LF (%)	99.9	99.7	99.7	100.1	100.1	99.8	99.5	99.5	98.6	99.1	94.5	0.0	90.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.7	0.0	91.2
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.3	4.8	100.0	9.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	3.9	100.0	8.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.9	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 02 Dec 1973
Date of First Criticality: 28/01/1978
Date of Grid Connection: 24/02/1978
Date of Commercial Operation: 10 Dec 1978

Lifetime Generation: 154304.0 GW(e).h
Cumulative Energy Availability Factor: 71.1%
Cumulative Load Factor: 70.8%
Cumulative Unit Capability Factor: 71.2%
Cumulative Energy Unavailability Factor: 28.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1978	1432.4	760	85.4	85.4	85.4	85.4	85.4	85.4	85.4	2194	99.4
1979	3917.4	760	58.8	64.2	58.8	64.2	58.8	64.2	58.8	6213	70.9
1980	4317.0	760	64.7	64.4	64.7	64.4	64.7	64.4	64.7	6326	72.0
1981	4667.5	760	70.1	66.1	70.1	66.1	70.1	66.2	66.2	6585	75.2
1982	5734.7	760	86.1	70.8	86.1	70.8	86.1	70.8	86.1	7776	88.8
1983	4818.2	760	72.4	71.1	72.4	71.1	72.4	71.1	72.4	6485	74.0
1984	4433.2	760	66.8	70.4	66.8	70.4	66.4	70.4	66.4	5924	67.4
1985	4409.0	760	66.6	69.9	66.6	69.9	66.2	69.8	66.2	5889	67.2
1986	4315.2	760	65.0	69.3	65.0	69.3	64.8	69.2	64.8	5733	65.4
1987	5964.0	760	89.9	71.5	89.9	71.5	89.6	71.4	89.6	7927	90.5
1988	5309.9	760	79.7	72.3	79.7	72.3	79.5	72.2	79.5	7066	80.4
1989	4232.6	760	63.8	71.6	63.8	71.6	63.6	71.4	63.6	5661	64.6
1990	4273.8	760	64.6	71.0	64.6	71.0	64.2	70.8	64.2	5715	65.2
1991	6483.4	760	98.0	73.0	98.0	73.0	97.4	72.8	97.4	8630	98.5
1992	4082.7	760	61.4	72.2	61.4	72.2	61.2	72.0	61.2	5475	62.3
1993	4206.6	760	63.5	71.6	63.4	71.6	63.2	71.4	63.2	5597	63.9
1994	6323.3	760	95.3	73.1	95.3	73.1	95.0	72.9	95.0	8416	96.1
1995	5485.7	760	82.8	73.7	82.7	73.7	82.4	73.4	82.4	7339	83.8
1996	4949.9	760	74.4	73.7	74.4	73.7	74.1	73.5	74.1	6545	74.5
1997	4556.8	760	68.6	73.4	68.6	73.4	68.4	73.2	68.4	6038	68.9
1998	5441.4	760	82.0	73.9	82.0	73.9	81.7	73.6	81.7	7216	82.4
1999	5890.5	760	88.8	74.6	88.8	74.6	88.5	74.3	88.5	7826	89.3
2000	4415.9	760	66.5	74.2	66.5	74.2	66.1	74.0	66.1	5856	66.7
2001	5858.5	760	88.7	74.8	88.4	74.8	88.0	74.6	88.0	7772	88.7
2002	4687.7	760	70.9	74.7	70.9	74.6	70.4	74.4	70.4	6191	70.7
2003	0.0	760	0.0	71.7	0.0	71.7	0.0	71.5	0.0	0	0.0
2004	4729.0	760	71.2	71.7	71.2	71.7	70.8	71.4	70.8	6262	71.3
2005	1515.6	760	22.9	69.9	22.9	69.9	22.8	69.6	22.8	2188	25.0
2006	4811.4	760	73.1	70.0	73.0	70.0	72.3	69.7	72.3	6500	74.2
2007	5050.6	760	76.9	70.3	76.2	70.2	75.9	69.9	75.9	6852	78.2
2008	4410.3	760	69.2	70.2	66.6	70.1	66.1	69.8	66.1	6111	69.6
2009	5462.1	760	82.5	70.6	82.4	70.5	82.0	70.2	82.0	7261	82.9
2010	6040.8	760	91.1	71.2	91.0	71.1	90.7	70.8	90.7	7992	91.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					391	
C. Inspection, maintenance or repair combined with refuelling	768			1771		
D. Inspection, maintenance or repair without refuelling				47		
J. Grid limitation, failure or grid unavailability						0
Z. Others					85	
Subtotal	768	0	0	1818	476	0
Total		768			2294	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		252
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		6
15. Reactor Cooling Systems		30
31. Turbine and auxiliaries		31
32. Feedwater and Main Steam System		58
41. Main Generator Systems		8
42. Electrical Power Supply Systems		0
Total	0	388

JP-17 FUKUSHIMA-DAIICHI-5

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 760.0 MW(e)
Design Net Capacity: 760.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5888.0 GW(e).h
Energy Availability Factor: 85.5%
Load Factor: 88.4%
Operating Factor: 85.6%
Energy Unavailability Factor: 14.5%
Total Off-line Time: 1259 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	588.7	531.5	588.7	571.1	589.7	568.1	581.8	580.0	558.5	580.1	34.2	115.4	5888.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.0	19.7	85.5
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.0	19.7	85.5
LF (%)	104.1	104.1	104.1	104.4	104.3	103.8	102.9	102.6	102.1	102.6	6.2	20.4	88.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.0	21.8	85.6
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.0	80.3	14.5
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.0	80.3	14.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 22/05/1972 **Lifetime Generation:** 156407.0 GW(e).h
Date of First Criticality: 26/08/1977 **Cumulative Energy Availability Factor:** 71.7%
Date of Grid Connection: 22/09/1977 **Cumulative Load Factor:** 71.5%
Date of Commercial Operation: 18/04/1978 **Cumulative Unit Capability Factor:** 71.8%
Cumulative Energy Unavailability Factor: 28.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1978	4047.9	760	80.7	80.7	80.7	80.7	80.7	80.7	80.7	6532	99.0
1979	3898.6	760	58.6	68.1	58.6	68.1	58.6	68.1	58.6	5847	66.7
1980	4282.6	760	64.1	66.6	64.1	66.6	64.2	66.6	64.2	6467	73.6
1981	4553.9	760	68.4	67.1	68.4	67.1	68.4	67.1	68.4	6616	75.5
1982	4061.3	760	60.7	65.8	60.7	65.8	61.0	65.8	61.0	5789	66.1
1983	5338.8	760	80.2	68.3	80.2	68.3	80.2	68.3	80.2	7328	83.7
1984	4691.5	760	70.9	68.7	70.9	68.7	70.3	68.6	62.93	6293	71.6
1985	4112.4	760	62.1	67.8	62.1	67.8	61.8	67.7	61.8	5547	63.3
1986	4157.4	760	63.2	67.3	63.2	67.3	62.4	67.1	62.4	5622	64.2
1987	3995.0	760	60.8	66.6	60.5	66.6	60.0	66.4	60.0	5399	61.6
1988	5952.7	760	90.0	68.8	90.0	68.8	89.2	68.5	89.2	7973	90.8
1989	4766.5	760	72.2	69.1	72.2	69.1	71.6	68.8	71.6	6401	73.1
1990	3956.5	760	60.2	68.4	60.2	68.4	59.4	68.0	59.4	5354	61.1
1991	6575.8	760	100.0	70.7	100.0	70.7	98.8	70.3	98.8	8760	100.0
1992	4841.2	760	73.3	70.9	73.3	70.8	72.5	70.4	72.5	6488	73.9
1993	4059.7	760	61.7	70.3	61.7	70.3	61.0	69.8	61.0	5448	62.2
1994	4246.2	760	64.6	70.0	64.6	69.9	63.8	69.5	63.8	5723	65.3
1995	5878.7	760	89.1	71.0	89.1	71.0	88.3	70.5	88.3	7885	90.0
1996	5666.9	760	85.6	71.8	85.6	71.8	84.9	71.3	84.9	7521	85.6
1997	4609.4	760	69.8	71.7	69.8	71.7	69.2	71.2	69.2	6139	70.1
1998	5369.9	760	81.7	72.2	81.5	72.2	80.7	71.7	80.7	7217	82.4
1999	6154.1	760	93.3	73.2	93.2	73.1	92.4	72.6	92.4	8184	93.4
2000	1647.0	760	24.9	71.0	24.9	71.0	24.7	70.5	24.7	2187	24.9
2001	5905.1	760	89.7	71.8	89.6	71.8	88.7	71.3	88.7	7869	89.8
2002	6590.5	760	100.0	73.0	99.8	72.9	99.0	72.4	99.0	8760	100.0
2003	2723.8	760	41.4	71.7	41.4	71.7	40.9	71.2	40.9	3627	41.4
2004	5471.3	760	82.9	72.2	82.8	72.1	82.0	71.6	82.0	7281	82.9
2005	2792.6	760	42.4	71.1	42.4	71.0	41.9	70.5	41.9	3781	43.2
2006	4656.9	760	70.7	71.1	70.6	71.0	69.9	70.5	69.9	6241	71.2
2007	5389.6	760	82.0	71.4	81.8	71.4	81.0	70.8	81.0	7205	82.2
2008	3930.7	760	57.5	71.0	57.4	70.9	58.9	70.4	58.9	5100	58.1
2009	5720.1	760	82.8	71.4	82.8	71.3	85.9	70.9	85.9	7282	83.1
2010	5888.0	760	85.5	71.8	85.5	71.7	88.4	71.5	88.4	7501	85.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1259			142	
C. Inspection, maintenance or repair combined with refuelling				2024		
D. Inspection, maintenance or repair without refuelling				51		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
Z. Others					48	
Subtotal	0	1259	0	2075	190	0
Total		1259			2265	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		11
13. Reactor Auxiliary Systems		3
14. Safety Systems		58
15. Reactor Cooling Systems		23
31. Turbine and auxiliaries		18
32. Feedwater and Main Steam System	1259	12
41. Main Generator Systems		13
42. Electrical Power Supply Systems		1
Total	1259	139

JP-18 FUKUSHIMA-DAIICHI-6

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: GE/T (GENERAL ELECTRIC CO. / TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5665.6 GW(e).h
 Energy Availability Factor: 58.3%
 Load Factor: 60.6%
 Operating Factor: 58.7%
 Energy Unavailability Factor: 41.7%
 Total Off-line Time: 3618 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	829.1	748.9	504.7	802.2	827.5	798.1	820.9	334.1	0.0	0.0	0.0	0.0	5665.6
EAF (%)	100.0	100.0	61.9	100.0	99.9	100.0	100.0	41.1	0.0	0.0	0.0	0.0	58.3
UCF (%)	100.0	100.0	61.9	100.0	100.0	100.0	100.0	41.1	0.0	0.0	0.0	0.0	58.3
LF (%)	104.4	104.5	63.6	104.4	104.2	103.9	103.4	42.1	0.0	0.0	0.0	0.0	60.6
OF (%)	100.0	100.0	65.3	100.0	100.0	100.0	100.0	41.9	0.0	0.0	0.0	0.0	58.7
EUAF (%)	0.0	0.0	38.1	0.0	0.1	0.0	0.0	58.9	100.0	100.0	100.0	100.0	41.7
PUF (%)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	58.9	100.0	41.9	0.0	0.0	16.8
UCLF (%)	0.0	0.0	38.1	0.0	0.0	0.0	0.0	0.0	0.0	58.1	100.0	100.0	24.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 26/10/1973
 Date of First Criticality: 03 Sep 1979
 Date of Grid Connection: 05 Apr 1979
 Date of Commercial Operation: 24/10/1979

Lifetime Generation: 206650.0 GW(e).h
 Cumulative Energy Availability Factor: 70.4%
 Cumulative Load Factor: 70.3%
 Cumulative Unit Capability Factor: 70.5%
 Cumulative Energy Unavailability Factor: 29.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	1967.8	1053	84.5	84.5	84.5	84.5	85.1	85.1	1906	86.3
1980	6441.1	1047	69.9	72.9	69.9	72.9	70.0	73.1	6289	71.6
1981	7418.6	1067	81.5	76.7	81.5	76.7	79.4	75.9	7756	88.5
1982	6666.5	1067	71.2	75.0	71.2	75.0	71.3	74.5	6577	75.1
1983	5387.8	1067	57.6	70.9	57.6	70.9	57.6	70.5	5308	60.6
1984	5933.2	1067	64.2	69.6	64.2	69.6	63.3	69.1	5708	65.0
1985	5384.8	1067	58.1	67.8	58.1	67.8	57.6	67.3	5196	59.3
1986	7783.5	1067	84.3	70.1	84.3	70.1	83.3	69.5	7390	84.4
1987	7789.2	1067	84.1	71.8	84.1	71.8	83.3	71.2	7406	84.5
1988	5593.1	1067	60.1	70.5	60.1	70.5	59.7	69.9	5385	61.3
1989	5128.4	1067	55.8	69.1	55.8	69.1	54.9	68.4	4956	56.6
1990	7727.1	1067	82.9	70.3	82.9	70.3	82.7	69.7	7394	84.4
1991	6948.7	1067	75.1	70.7	75.1	70.7	74.3	70.1	6627	75.7
1992	5213.6	1067	56.0	69.6	56.0	69.6	55.6	69.0	4993	56.8
1993	6530.9	1067	70.2	69.6	70.2	69.6	69.9	69.1	6168	70.4
1994	8079.4	1067	86.8	70.7	86.7	70.7	86.4	70.2	7679	87.7
1995	6850.8	1067	73.7	70.9	73.6	70.9	73.3	70.4	6517	74.4
1996	6157.8	1067	66.0	70.6	66.0	70.6	65.7	70.1	5804	66.1
1997	9307.7	1067	99.9	72.2	99.8	72.2	99.6	71.7	8760	100.0
1998	6329.0	1067	68.1	72.0	68.0	72.0	67.7	71.5	6026	68.8
1999	7960.5	1067	85.8	72.7	85.5	72.7	85.2	72.2	7523	85.9
2000	7495.6	1067	80.4	73.1	80.4	73.0	80.0	72.6	7074	80.5
2001	7778.9	1067	83.7	73.6	83.7	73.5	83.2	73.0	7417	84.7
2002	6270.9	1067	67.5	73.3	67.5	73.3	67.1	72.8	5912	67.5
2003	4623.9	1067	49.7	72.3	49.7	72.3	49.5	71.8	4338	49.5
2004	1088.8	1067	11.7	69.9	11.7	69.9	11.6	69.4	1028	11.7
2005	7986.5	1067	85.2	70.5	85.2	70.5	85.4	70.0	7503	85.7
2006	5321.8	1067	56.7	70.0	56.7	70.0	56.9	69.6	5004	57.1
2007	6833.5	1067	74.7	70.2	73.0	70.1	73.1	69.7	6552	74.8
2008	8424.5	1067	89.4	70.8	89.4	70.7	89.9	70.4	7883	89.7
2009	7131.0	1067	74.0	70.9	74.0	70.8	76.3	70.6	6552	74.8
2010	5665.6	1067	58.3	70.5	58.3	70.4	60.6	70.3	5142	58.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2163			216	
C. Inspection, maintenance or repair combined with refuelling	1474			1995		
D. Inspection, maintenance or repair without refuelling				136		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Z. Others					51	
Subtotal	1474	2163	0	2131	274	0
Total		3637			2405	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		136
13. Reactor Auxiliary Systems	696	22
21. Fuel Handling and Storage Facilities	1200	
31. Turbine and auxiliaries	267	7
32. Feedwater and Main Steam System		40
41. Main Generator Systems		9
Total	2163	214

JP-25 FUKUSHIMA-DAINI-1

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6666.8 GW(e).h
 Energy Availability Factor: 71.4%
 Load Factor: 71.3%
 Operating Factor: 72.0%
 Energy Unavailability Factor: 28.6%
 Total Off-line Time: 2456 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	792.4	716.4	792.4	770.2	794.3	309.1	0.0	0.0	142.8	790.3	766.7	792.2	6666.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	39.8	0.0	0.0	18.5	100.0	100.0	100.0	71.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	39.8	0.0	0.0	18.5	100.0	100.0	100.0	71.4
LF (%)	99.8	99.9	99.8	100.3	100.1	40.2	0.0	0.0	18.6	99.6	99.8	99.8	71.3
OF (%)	100.0	100.0	100.0	100.0	100.0	42.4	0.0	0.0	23.2	100.0	100.0	100.0	72.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	60.2	100.0	100.0	81.5	0.0	0.0	0.0	28.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	27.2	100.0	100.0	81.5	0.0	0.0	0.0	25.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	32.9	0.0	0.0	0.0	0.0	0.0	0.0	2.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 16/03/1976
 Date of First Criticality: 17/06/1981
 Date of Grid Connection: 31/07/1981
 Date of Commercial Operation: 20/04/1982

Lifetime Generation: 203875.0 GW(e).h
 Cumulative Energy Availability Factor: 76.1%
 Cumulative Load Factor: 75.4%
 Cumulative Unit Capability Factor: 76.2%
 Cumulative Energy Unavailability Factor: 23.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	6738.3	1067	95.7	95.7	95.7	95.7	95.7	95.7	6522	98.8
1983	6282.2	1067	67.2	79.4	67.2	79.4	67.2	79.4	6130	70.0
1984	6344.4	1067	68.6	75.5	68.6	75.5	67.7	75.2	6175	70.3
1985	8152.9	1067	88.0	78.8	88.0	78.8	87.2	78.4	7776	88.8
1986	7741.0	1067	83.6	79.8	83.6	79.8	82.8	79.3	7404	84.5
1987	6992.1	1067	75.8	79.1	75.8	79.1	74.8	78.5	6710	76.6
1988	5959.3	1067	64.4	76.9	64.4	76.9	63.6	76.3	5744	65.4
1989	6246.2	1067	67.4	75.7	67.4	75.7	66.8	75.1	6029	68.8
1990	8217.0	1067	88.9	77.2	88.9	77.2	87.9	76.6	7914	90.3
1991	6191.1	1067	67.2	76.2	67.2	76.2	66.2	75.5	5927	67.7
1992	6901.5	1067	75.1	76.1	74.6	76.0	73.6	75.3	6656	75.8
1993	5613.1	1067	60.9	74.8	60.9	74.8	60.1	74.0	5384	61.5
1994	8309.1	1067	90.1	76.0	90.1	76.0	88.9	75.2	7936	90.6
1995	7727.5	1067	83.5	76.5	83.5	76.5	82.7	75.7	7333	83.7
1996	6761.4	1067	73.1	76.3	73.1	76.3	72.1	75.5	6425	73.1
1997	7304.8	1067	79.2	76.5	79.2	76.5	78.2	75.7	6993	79.8
1998	7694.1	1067	83.3	76.9	83.3	76.9	82.3	76.1	7318	83.5
1999	7389.4	1067	80.0	77.1	80.0	77.0	79.1	76.2	7011	80.0
2000	8229.0	1067	89.1	77.7	89.1	77.7	87.8	76.8	7824	89.1
2001	5902.6	1067	64.4	77.0	64.4	77.0	63.2	76.2	5645	64.4
2002	9238.2	1067	100.0	78.1	99.9	78.1	98.8	77.2	8760	100.0
2003	3239.3	1067	34.9	76.2	34.9	76.1	34.7	75.3	3061	34.9
2004	6749.7	1067	73.2	76.0	72.6	76.0	72.0	75.1	6522	74.2
2005	5606.2	1067	60.3	75.4	60.3	75.3	60.0	74.5	5382	61.4
2006	6846.8	1067	73.5	75.3	73.5	75.2	73.3	74.5	6473	73.9
2007	6891.7	1067	74.3	75.3	74.2	75.2	73.7	74.4	6547	74.7
2008	9333.7	1067	100.0	76.2	100.0	76.1	99.6	75.4	8784	100.0
2009	7494.0	1067	80.7	76.3	80.7	76.3	80.2	75.5	7096	81.0
2010	6666.8	1067	71.4	76.2	71.4	76.1	71.3	75.4	6304	72.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		223			324	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	2232			1534		
D. Inspection, maintenance or repair without refuelling				31		
Subtotal	2232	223	0	1565	326	0
Total		2455			1891	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		90
13. Reactor Auxiliary Systems		17
14. Safety Systems	223	
15. Reactor Cooling Systems		172
31. Turbine and auxiliaries		16
35. All other I&C Systems		11
41. Main Generator Systems		2
42. Electrical Power Supply Systems		13
Total	223	321

JP-26 FUKUSHIMA-DAINI-2

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7003.6 GW(e).h
 Energy Availability Factor: 75.3%
 Load Factor: 74.9%
 Operating Factor: 75.6%
 Energy Unavailability Factor: 24.7%
 Total Off-line Time: 2135 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	791.8	715.7	115.4	0.0	0.0	691.6	791.0	789.6	760.9	788.3	766.5	792.8	7003.6
EAF (%)	100.0	100.0	15.6	0.0	0.0	90.4	100.0	100.0	99.9	100.0	100.0	100.0	75.3
UCF (%)	100.0	100.0	15.6	0.0	0.0	90.4	100.0	100.0	100.0	100.0	100.0	100.0	75.3
LF (%)	99.7	99.8	14.5	0.0	0.0	90.0	99.6	99.5	99.0	99.3	99.8	99.9	74.9
OF (%)	100.0	100.0	16.1	0.0	0.0	93.5	100.0	100.0	100.0	100.0	100.0	100.0	75.6
EUf (%)	0.0	0.0	84.4	100.0	100.0	9.6	0.0	0.0	0.1	0.0	0.0	0.0	24.7
PUF (%)	0.0	0.0	84.4	100.0	100.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	24.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/05/1979
 Date of First Criticality: 26/04/1983
 Date of Grid Connection: 23/06/1983
 Date of Commercial Operation: 02 Mar 1984

Lifetime Generation: 188864.0 GW(e).h
 Cumulative Energy Availability Factor: 74.7%
 Cumulative Load Factor: 74.3%
 Cumulative Unit Capability Factor: 74.7%
 Cumulative Energy Unavailability Factor: 25.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	8480.8	1067	98.9	98.9	98.9	98.9	98.9	98.9	8040	100.0
1985	6760.1	1067	72.9	85.3	72.9	85.3	72.3	85.0	6534	74.6
1986	7063.9	1067	76.2	82.2	76.2	82.2	75.6	81.8	6727	76.8
1987	6844.9	1067	74.3	80.2	74.3	80.2	73.2	79.6	6607	75.4
1988	7628.4	1067	82.1	80.6	82.1	80.6	81.4	80.0	7238	82.4
1989	8308.8	1067	89.4	82.1	89.4	82.1	88.9	81.5	7920	90.4
1990	6261.3	1067	67.3	79.9	67.3	79.9	67.0	79.4	5956	68.0
1991	6887.3	1067	74.3	79.2	74.3	79.2	73.7	78.7	6579	75.1
1992	8116.3	1067	87.1	80.1	87.1	80.1	86.6	79.6	7656	87.2
1993	6785.7	1067	73.2	79.4	73.2	79.4	72.6	78.9	6427	73.4
1994	7058.2	1067	76.0	79.1	76.0	79.1	75.5	78.5	6696	76.4
1995	6786.7	1067	73.1	78.6	73.1	78.6	72.6	78.0	6435	73.5
1996	9327.9	1067	100.0	80.3	100.0	80.3	99.5	79.7	8784	100.0
1997	7405.6	1067	79.8	80.2	79.8	80.2	79.2	79.7	7021	80.1
1998	7447.1	1067	80.2	80.2	80.2	80.2	79.7	79.7	7104	81.1
1999	8231.6	1067	88.7	80.8	88.6	80.8	88.1	80.2	7765	88.6
2000	8874.5	1067	95.2	81.6	95.2	81.6	94.7	81.1	8372	95.3
2001	6761.9	1067	73.1	81.1	73.1	81.1	72.3	80.6	6378	72.8
2002	4645.2	1067	50.2	79.5	50.2	79.5	49.7	78.9	4398	50.2
2003	0.0	1067	0.0	75.5	0.0	75.5	0.0	75.0	0	0.0
2004	3169.8	1067	33.9	73.5	33.9	73.5	33.8	73.0	2978	33.9
2005	7593.5	1067	81.3	73.9	81.2	73.9	81.2	73.4	7128	81.4
2006	7858.2	1067	84.3	74.3	84.3	74.3	84.1	73.9	7413	84.6
2007	4793.1	1067	51.8	73.4	51.6	73.4	51.3	72.9	4593	52.4
2008	7896.3	1067	84.4	73.8	84.4	73.8	84.2	73.4	7416	84.4
2009	9020.9	1067	96.7	74.7	96.6	74.7	96.5	74.3	8497	97.0
2010	7003.6	1067	75.3	74.7	75.3	74.7	74.9	74.3	6625	75.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					236	
C. Inspection, maintenance or repair combined with refuelling	2146			1657		
D. Inspection, maintenance or repair without refuelling				143		
Z. Others					139	
Subtotal	2146	0	0	1800	375	0
Total		2146			2175	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		110
12. Reactor I&C Systems		45
13. Reactor Auxiliary Systems		20
14. Safety Systems		6
15. Reactor Cooling Systems		53
Total	0	234

JP-35 FUKUSHIMA-DAINI-3

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1067.0 MW(e)
Design Net Capacity: 1067.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7564.5 GW(e).h
Energy Availability Factor: 81.4%
Load Factor: 80.9%
Operating Factor: 82.0%
Energy Unavailability Factor: 18.6%
Total Off-line Time: 1574 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	150.2	0.0	439.7	766.6	790.7	762.8	787.2	784.4	750.6	784.5	760.4	787.3	7564.5
EAF (%)	18.3	0.0	55.0	100.0	100.0	99.9	100.0	99.9	97.7	100.0	100.0	100.0	81.4
UCF (%)	18.3	0.0	55.0	100.0	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0	81.6
LF (%)	18.9	0.0	55.4	99.8	99.6	99.3	99.2	98.8	97.7	98.8	99.0	99.2	80.9
OF (%)	19.4	0.0	59.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.0
EUf (%)	81.7	100.0	45.0	0.0	0.0	0.1	0.0	0.1	2.3	0.0	0.0	0.0	18.6
PUf (%)	81.7	100.0	45.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	18.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 23/03/1981
Date of First Criticality: 18/10/1984
Date of Grid Connection: 14/12/1984
Date of Commercial Operation: 21/06/1985

Lifetime Generation: 161294.0 GW(e).h
Cumulative Energy Availability Factor: 67.7%
Cumulative Load Factor: 66.8%
Cumulative Unit Capability Factor: 67.7%
Cumulative Energy Unavailability Factor: 32.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	4851.3	1067	95.4	95.4	95.4	95.4	88.5	88.5	4707	91.6
1986	6837.4	1067	74.4	82.1	74.4	82.1	73.2	78.8	6559	74.9
1987	7459.9	1067	80.8	81.6	80.8	81.6	79.8	79.2	7104	81.1
1988	8389.1	1067	90.7	84.2	90.7	84.2	89.5	82.1	8126	92.5
1989	120.2	1067	1.3	66.1	1.3	66.1	1.3	64.5	144	1.6
1990	912.9	1067	9.8	56.0	9.8	56.0	9.8	54.7	1037	11.8
1991	7695.1	1067	83.1	60.1	83.1	60.1	82.3	58.9	7344	83.8
1992	7533.2	1067	81.3	62.9	81.3	62.9	80.4	61.7	7195	81.9
1993	6810.5	1067	73.8	64.2	73.8	64.2	72.9	63.0	6494	74.1
1994	4841.6	1067	52.5	63.0	52.5	63.0	51.8	61.9	4669	53.3
1995	8992.5	1067	97.2	66.2	97.2	66.2	96.2	65.1	8557	97.7
1996	8060.6	1067	87.0	68.0	87.0	68.0	86.0	66.9	7642	87.0
1997	7487.4	1067	81.2	69.0	81.2	69.0	80.1	68.0	7120	81.3
1998	8284.7	1067	89.9	70.6	89.7	70.6	88.6	69.5	7905	90.2
1999	8566.8	1067	92.7	72.1	92.7	72.1	91.7	71.0	8127	92.8
2000	7643.9	1067	82.5	72.8	82.5	72.8	81.6	71.7	7258	82.6
2001	3288.0	1067	35.9	70.6	35.8	70.5	35.2	69.5	3185	36.4
2002	6123.4	1067	66.3	70.3	66.3	70.3	65.5	69.2	5806	66.3
2003	0.0	1067	0.0	66.5	0.0	66.5	0.0	65.5	0	0.0
2004	6862.3	1067	73.7	66.9	73.7	66.9	73.2	65.9	6508	74.1
2005	359.5	1067	4.0	63.8	4.0	63.8	3.8	62.9	390	4.5
2006	8677.4	1067	93.6	65.2	93.6	65.2	92.8	64.3	8221	93.8
2007	6442.9	1067	69.8	65.4	69.8	65.4	68.9	64.5	6154	70.3
2008	6730.2	1067	72.6	65.7	72.5	65.7	71.8	64.8	6427	73.2
2009	9283.3	1067	99.9	67.1	99.9	67.1	99.3	66.2	8760	100.0
2010	7564.5	1067	81.6	67.7	81.4	67.7	80.9	66.8	7186	82.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					583	
C. Inspection, maintenance or repair combined with refuelling	1587			1886		
D. Inspection, maintenance or repair without refuelling				52		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					142	
Z. Others					32	
Subtotal	1587	0	0	1938	757	0
Total		1587			2695	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		137
12. Reactor I&C Systems		190
15. Reactor Cooling Systems		244
32. Feedwater and Main Steam System		11
Total	0	582

JP-38 FUKUSHIMA-DAINI-4

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7933.2 GW(e).h
 Energy Availability Factor: 85.3%
 Load Factor: 84.9%
 Operating Factor: 85.5%
 Energy Unavailability Factor: 14.7%
 Total Off-line Time: 1272 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	791.0	715.1	790.4	769.4	793.0	762.5	790.1	787.4	757.5	783.0	193.7	0.0	7933.2
EAF (%)	100.0	100.0	99.9	100.0	100.0	99.9	100.0	99.9	99.7	99.4	26.1	0.0	85.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.4	26.1	0.0	85.4
LF (%)	99.6	99.7	99.6	100.2	99.9	99.3	99.5	99.2	98.6	98.6	25.2	0.0	84.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	26.7	0.0	85.5
EUf (%)	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.3	0.6	73.9	100.0	14.7
PUf (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.6	73.9	100.0	14.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 28/05/1981
 Date of First Criticality: 24/10/1986
 Date of Grid Connection: 17/12/1986
 Date of Commercial Operation: 25/08/1987

Lifetime Generation: 160292.0 GW(e).h
 Cumulative Energy Availability Factor: 73.0%
 Cumulative Load Factor: 72.3%
 Cumulative Unit Capability Factor: 73.0%
 Cumulative Energy Unavailability Factor: 27.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	3642.2	1067	100.0	100.0	100.0	100.0	93.0	93.0	3463	94.3
1988	7010.3	1067	75.5	82.7	75.5	82.7	74.8	80.2	6739	76.7
1989	9137.9	1067	99.2	89.6	99.2	89.6	97.8	87.4	8728	99.6
1990	7051.4	1067	76.0	85.6	76.0	85.6	75.4	83.9	6757	77.1
1991	7278.9	1067	79.0	84.1	79.0	84.1	77.9	82.6	7029	80.2
1992	5901.7	1067	63.8	80.4	63.5	80.3	63.0	78.9	5646	64.3
1993	9049.0	1067	97.6	83.1	97.5	83.0	96.8	81.7	8608	98.3
1994	6735.5	1067	73.5	81.8	72.7	81.6	72.1	80.4	6481	74.0
1995	7782.7	1067	83.9	82.0	83.9	81.9	83.3	80.8	7385	84.3
1996	6842.6	1067	73.7	81.1	73.7	81.0	73.0	79.9	6470	73.7
1997	9275.9	1067	99.9	82.9	99.9	82.8	99.2	81.8	8760	100.0
1998	8075.0	1067	87.2	83.3	87.2	83.2	86.4	82.2	7678	87.6
1999	8136.0	1067	87.8	83.7	87.8	83.6	87.0	82.6	7699	87.9
2000	6685.2	1067	72.0	82.8	72.0	82.7	71.3	81.7	6329	72.1
2001	9250.2	1067	99.9	84.0	99.7	83.9	99.0	82.9	8760	100.0
2002	5986.6	1067	64.7	82.7	64.7	82.6	64.0	81.7	5668	64.7
2003	0.0	1067	0.0	77.7	0.0	77.6	0.0	76.7	0	0.0
2004	1450.0	1067	15.5	74.1	15.5	74.0	15.5	73.2	1360	15.5
2005	5345.9	1067	57.2	73.2	57.2	73.1	57.2	72.3	5048	57.6
2006	5763.7	1067	62.0	72.6	62.0	72.6	61.7	71.8	5482	62.6
2007	6258.2	1067	67.1	72.4	67.1	72.3	67.0	71.6	5911	67.5
2008	7144.9	1067	76.7	72.6	76.7	72.5	76.2	71.8	6766	77.0
2009	6597.2	1067	70.9	72.5	70.9	72.4	70.6	71.7	6394	73.0
2010	7933.2	1067	85.4	73.0	85.3	73.0	84.9	72.3	7488	85.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					451	
C. Inspection, maintenance or repair combined with refuelling	1272			1549		
D. Inspection, maintenance or repair without refuelling				83		
Z. Others					237	
Subtotal	1272	0	0	1632	688	0
Total		1272			2320	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		31
12. Reactor I&C Systems		28
15. Reactor Cooling Systems		277
21. Fuel Handling and Storage Facilities		23
32. Feedwater and Main Steam System		81
33. Circulating Water System		1
42. Electrical Power Supply Systems		8
Total	0	449

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					134	
C. Inspection, maintenance or repair combined with refuelling	1772			2030		
D. Inspection, maintenance or repair without refuelling				19		
Subtotal	1772	0	0	2049	134	0
Total		1772			2183	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		9
13. Reactor Auxiliary Systems		45
15. Reactor Cooling Systems		18
16. Steam generation systems		57
42. Electrical Power Supply Systems		2
Total	0	131

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					82	
C. Inspection, maintenance or repair combined with refuelling				1580		
Subtotal	0	0	0	1580	82	0
Total	0			1662		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		4
15. Reactor Cooling Systems		60
16. Steam generation systems		17
Total	0	81

JP-45 GENKAI-3

Operator: KYUSHU (KYUSHU ELECTRIC POWER CO.,INC.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1127.0 MW(e)
 Design Net Capacity: 1127.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9506.5 GW(e).h
 Energy Availability Factor: 94.2%
 Load Factor: 96.3%
 Operating Factor: 94.3%
 Energy Unavailability Factor: 5.8%
 Total Off-line Time: 503 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	857.8	774.6	857.6	831.1	859.5	830.8	856.6	851.5	825.2	856.9	830.7	274.3	9506.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	32.0	94.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	32.0	94.2
LF (%)	102.3	102.3	102.3	102.4	102.5	102.4	102.2	101.6	101.7	102.2	102.4	32.7	96.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	32.4	94.3
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.0	5.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.0	5.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

GENKAI 3 STARTED TO USE URANIUM-PLUTONIUM MIXED OXIDE (MOX) FUEL FROM DECEMBER 2009.

5. Historical Summary

Date of Construction Start: 06 Jan 1988
 Date of First Criticality: 28/05/1993
 Date of Grid Connection: 15/06/1993
 Date of Commercial Operation: 18/03/1994

Lifetime Generation: 149375.0 GW(e).h
 Cumulative Energy Availability Factor: 85.1%
 Cumulative Load Factor: 86.4%
 Cumulative Unit Capability Factor: 85.1%
 Cumulative Energy Unavailability Factor: 14.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	8086.5	1127	97.2	97.2	97.2	97.2	97.7	97.7	7146	97.3
1995	7356.3	1127	74.1	84.7	74.1	84.7	74.5	85.1	6588	75.2
1996	7444.9	1127	74.9	81.2	74.9	81.2	75.2	81.6	6663	75.9
1997	8259.9	1127	83.3	81.8	83.3	81.8	83.7	82.1	7358	84.0
1998	9633.1	1127	97.1	84.9	97.1	84.9	97.6	85.3	8514	97.2
1999	7999.8	1127	80.7	84.2	80.7	84.2	81.0	84.6	7068	80.7
2000	8109.7	1127	81.6	83.8	81.6	83.8	81.9	84.2	7164	81.6
2001	8205.1	1127	82.7	83.7	82.7	83.7	83.1	84.1	7249	82.8
2002	9561.5	1127	96.4	85.1	96.4	85.1	96.9	85.5	8446	96.4
2003	8667.8	1127	85.6	85.2	85.6	85.2	87.8	85.7	7497	85.6
2004	8121.1	1127	79.9	84.7	79.9	84.7	82.0	85.4	7015	79.9
2005	8658.9	1127	85.3	84.7	85.3	84.7	87.7	85.6	7523	85.9
2006	9725.2	1127	95.9	85.6	95.9	85.6	98.5	86.6	8401	95.9
2007	7988.3	1127	79.1	85.1	79.1	85.1	80.9	86.2	6987	79.8
2008	8259.6	1127	81.6	84.9	81.6	84.9	83.4	86.0	7211	82.1
2009	8061.9	1127	79.9	84.6	79.9	84.6	81.7	85.7	7043	80.4
2010	9506.5	1127	94.2	85.1	94.2	85.1	96.3	86.4	8257	94.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
C. Inspection, maintenance or repair combined with refuelling	503			1240		
Subtotal	503	0	0	1240	0	0
Total		503			1240	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1994 to 2010 Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

JP-46 GENKAI-4

Operator: KYUSHU (KYUSHU ELECTRIC POWER CO.,INC.)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 1127.0 MW(e)
Design Net Capacity: 1127.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8365.6 GW(e).h
Energy Availability Factor: 83.4%
Load Factor: 84.7%
Operating Factor: 84.0%
Energy Unavailability Factor: 16.6%
Total Off-line Time: 1405 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	852.9	770.6	852.9	826.0	854.0	826.4	852.8	848.8	79.3	0.0	753.5	848.3	8365.6
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.7	0.0	92.0	100.0	83.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.7	0.0	92.0	100.0	83.4
LF (%)	101.7	101.8	101.7	101.8	101.9	101.8	101.7	101.2	9.8	0.0	92.9	101.2	84.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	10.1	0.0	98.1	100.0	100.0	84.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.3	100.0	8.0	0.0	16.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.3	100.0	8.0	0.0	16.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NONE

5. Historical Summary

Date of Construction Start: 15/07/1992
Date of First Criticality: 23/10/1996
Date of Grid Connection: 11 Dec 1996
Date of Commercial Operation: 25/07/1997

Lifetime Generation: 116870.0 GW(e).h
Cumulative Energy Availability Factor: 85.5%
Cumulative Load Factor: 86.5%
Cumulative Unit Capability Factor: 85.5%
Cumulative Energy Unavailability Factor: 14.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1997	4792.1	1127	100.0	100.0	100.0	100.0	96.3	96.3	4259	96.4
1998	7634.5	1127	76.7	84.5	76.7	84.5	77.3	83.7	6783	77.4
1999	9716.3	1127	97.7	89.8	97.7	89.8	98.4	89.6	8559	97.7
2000	8181.2	1127	82.0	87.6	82.0	87.6	82.6	87.6	7205	82.0
2001	8107.2	1127	81.5	86.2	81.5	86.2	82.1	86.4	7142	81.5
2002	8208.3	1127	82.4	85.5	82.4	85.5	83.1	85.8	7217	82.4
2003	9678.7	1127	96.1	87.2	96.1	87.2	98.0	87.7	8422	96.1
2004	8330.6	1127	82.4	86.5	82.4	86.5	84.2	87.2	7243	82.5
2005	8572.5	1127	85.0	86.3	85.0	86.3	86.8	87.2	7499	85.6
2006	7765.6	1127	77.0	85.4	77.0	85.4	78.7	86.3	6813	77.8
2007	10025.3	1127	100.0	86.8	100.0	86.8	101.5	87.7	8760	100.0
2008	7696.0	1127	76.6	85.9	76.6	85.9	77.7	86.8	6797	77.4
2009	8325.6	1127	83.1	85.6	83.1	85.6	84.3	86.6	7331	83.7
2010	8365.6	1127	83.4	85.5	83.4	85.5	84.7	86.5	7355	84.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1998 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					50	
C. Inspection, maintenance or repair combined with refuelling	1405			1144		
Subtotal	1405	0	0	1144	50	0
Total		1405			1194	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1998 to 2010 Average Hours Lost Per Year
15. Reactor Cooling Systems		17
41. Main Generator Systems		33
Total	0	50

JP-36 HAMAOKA-3

Operator: CHUBU (CHUBU ELECTRIC POWER CO.,INC)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1056.0 MW(e)
 Design Net Capacity: 1056.0 MW(e)
 Design Discharge Burnup: 29500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8434.8 GW(e).h
 Energy Availability Factor: 91.0%
 Load Factor: 91.2%
 Operating Factor: 91.0%
 Energy Unavailability Factor: 9.0%
 Total Off-line Time: 786 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	791.0	714.8	791.3	764.7	790.0	762.0	783.8	782.2	757.9	784.9	712.3	0.0	8434.8
EAFF (%)	100.0	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	93.6	0.0	91.0
UCF (%)	100.0	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0	93.7	0.0	91.0
LF (%)	100.7	100.7	100.7	100.6	100.5	100.2	99.8	99.6	99.7	99.9	93.7	0.0	91.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.2	0.0	91.0
EUFF (%)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.4	100.0	9.0
PUFF (%)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.4	100.0	9.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING

5. Historical Summary

Date of Construction Start: 18/04/1983
 Date of First Criticality: 21/11/1986
 Date of Grid Connection: 20/01/1987
 Date of Commercial Operation: 28/08/1987
 Lifetime Generation: 171104.0 GW(e).h
 Cumulative Energy Availability Factor: 78.2%
 Cumulative Load Factor: 77.6%
 Cumulative Unit Capability Factor: 78.4%
 Cumulative Energy Unavailability Factor: 21.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	3622.6	1066	99.5	99.5	99.5	99.5	92.5	92.5	3470	94.5
1988	7066.8	1066	75.8	82.8	75.8	82.8	75.5	80.5	6862	78.1
1989	8542.0	1066	92.4	86.7	92.4	86.7	91.5	85.0	8167	93.2
1990	6601.3	1056	71.4	82.3	71.4	82.3	71.4	81.1	6366	72.7
1991	6763.1	1056	73.5	80.3	73.5	80.3	73.1	79.3	6472	73.9
1992	6585.4	1056	71.7	78.7	71.4	78.7	71.0	77.8	6371	72.5
1993	8768.0	1056	95.3	81.3	95.3	81.2	94.8	80.4	8359	95.4
1994	6490.5	1056	77.4	80.8	77.4	80.7	70.2	79.0	6784	77.4
1995	7725.7	1056	84.6	81.2	84.1	81.1	83.5	79.6	7429	84.8
1996	6891.6	1056	74.8	80.6	74.7	80.4	74.3	79.0	6573	74.8
1997	8109.7	1056	88.3	81.3	88.3	81.2	87.7	79.8	7863	89.8
1998	9200.7	1056	100.0	82.9	100.0	82.8	99.5	81.5	8760	100.0
1999	7618.3	1056	82.8	82.9	82.8	82.8	82.4	81.6	7255	82.8
2000	7706.0	1056	83.6	83.0	83.6	82.9	83.1	81.7	7340	83.6
2001	6476.8	1056	70.4	82.1	70.4	82.0	70.0	80.9	6171	70.4
2002	6350.9	1056	69.0	81.3	69.0	81.2	68.7	80.1	6044	69.0
2003	1486.6	1056	16.1	77.3	16.1	77.2	16.1	76.2	1403	16.0
2004	9342.5	1056	100.0	78.6	100.0	78.5	100.7	77.6	8784	100.0
2005	5793.4	1056	62.2	77.7	62.1	77.7	62.6	76.8	5473	62.5
2006	6396.9	1056	69.2	77.3	68.7	77.2	69.2	76.4	6081	69.4
2007	9196.5	1056	100.0	78.4	99.2	78.3	99.4	77.5	8760	100.0
2008	6882.9	1056	74.8	78.2	74.0	78.1	74.2	77.4	6625	75.4
2009	6437.1	1056	69.2	77.8	69.2	77.7	69.6	77.0	6085	69.5
2010	8434.8	1056	91.0	78.4	91.0	78.2	91.2	77.6	7974	91.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					190	
C. Inspection, maintenance or repair combined with refuelling	785			1368		
D. Inspection, maintenance or repair without refuelling				29		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					41	
Z. Others						152
Subtotal	785	0	0	1397	388	0
Total		785			1785	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		162
31. Turbine and auxiliaries		3
35. All other I&C Systems		0
Total	0	165

JP-49 HAMAOKA-4

Operator: CHUBU (CHUBU ELECTRIC POWER CO.,INC)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1092.0 MW(e)
 Design Net Capacity: 1092.0 MW(e)
 Design Discharge Burnup: 39500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7513.0 GW(e).h
 Energy Availability Factor: 78.3%
 Load Factor: 78.5%
 Operating Factor: 78.4%
 Energy Unavailability Factor: 21.7%
 Total Off-line Time: 1890 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	817.8	738.4	817.0	790.2	816.2	788.0	811.0	808.4	783.7	342.2	0.0	0.0	7513.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.8	42.2	0.0	0.0	78.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.2	0.0	0.0	78.4
LF (%)	100.7	100.6	100.6	100.5	100.5	100.2	99.8	99.5	99.7	42.1	0.0	0.0	78.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	42.7	0.0	0.0	78.4
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	57.8	100.0	100.0	21.7
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.8	100.0	100.0	21.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING MOX FUEL LOADINGS IS POSTPONED AFTER NEXT YEAR.

5. Historical Summary

Date of Construction Start: 13/10/1989
 Date of First Criticality: 12 Feb 1992
 Date of Grid Connection: 27/01/1993
 Date of Commercial Operation: 09 Mar 1993
 Lifetime Generation: 127862.0 GW(e).h
 Cumulative Energy Availability Factor: 80.0%
 Cumulative Load Factor: 80.0%
 Cumulative Unit Capability Factor: 80.7%
 Cumulative Energy Unavailability Factor: 20.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	3186.2	1092	99.9	99.9	99.9	99.9	99.7	99.7	2928	100.0
1994	7110.4	1092	74.9	81.2	74.7	81.0	74.3	80.7	6576	75.1
1995	9546.0	1092	100.0	89.2	100.0	89.1	99.8	88.9	8760	100.0
1996	8301.3	1092	86.7	88.5	86.7	88.4	86.5	88.2	7615	86.7
1997	7883.0	1092	83.1	87.2	82.6	87.1	82.4	86.8	7302	83.4
1998	7154.1	1092	74.9	84.9	74.9	84.8	74.8	84.6	6604	75.4
1999	9545.1	1092	99.9	87.3	99.9	87.2	99.8	87.0	8760	100.0
2000	8233.7	1092	86.3	87.2	86.0	87.0	85.8	86.8	7577	86.3
2001	8773.5	1092	91.8	87.7	91.8	87.6	91.7	87.4	8046	91.8
2002	6436.4	1092	67.4	85.5	67.4	85.4	67.3	85.3	5906	67.4
2003	3729.8	1092	39.1	81.1	39.1	81.0	39.0	80.8	3415	39.0
2004	7279.7	1092	75.8	80.6	75.8	80.5	75.9	80.3	6668	75.9
2005	9595.6	1092	100.0	82.2	100.0	82.1	100.3	82.0	8760	100.0
2006	6523.5	1092	68.2	81.1	68.2	81.0	68.2	80.9	6423	73.3
2007	7720.9	1092	80.6	81.1	80.5	81.0	80.7	80.9	7098	81.0
2008	9293.6	1092	96.5	82.1	96.5	82.0	96.9	82.0	8512	96.9
2009	4847.5	1092	60.9	80.8	50.5	80.1	50.7	80.0	4480	51.1
2010	7513.0	1092	78.4	80.7	78.3	80.0	78.5	80.0	6870	78.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					451	
C. Inspection, maintenance or repair combined with refuelling	1889			1032		
D. Inspection, maintenance or repair without refuelling				35		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						52
Z. Others					62	
Subtotal	1889	0	0	1067	513	52
Total		1889			1632	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1994 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		308
13. Reactor Auxiliary Systems		23
31. Turbine and auxiliaries		104
32. Feedwater and Main Steam System		16
Total	0	451

2010 Operating Experience

JP-60 HAMAOKA-5

Operator: CHUBU (CHUBU ELECTRIC POWER CO.,INC)
Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1212.0 MW(e)
Design Net Capacity: 1325.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	100.0	100.0	45.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	0.0	0.0	54.8	100.0	54.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.5
UCLF (%)	0.0	0.0	0.0	0.0	45.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	62.5
XUF (%)	100.0	100.0	45.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

CONTINUANCE STOP SINCE AUTOMATIC SCRAM DUE TO EARTHQUAKE PERIODICAL INSPECTION AND REFUELING

5. Historical Summary

Date of Construction Start: 07 Dec 2000
Date of First Criticality: 23/03/2004
Date of Grid Connection: 26/04/2004
Date of Commercial Operation: 18/01/2005

Lifetime Generation: 35597.0 GW(e).h
Cumulative Energy Availability Factor: 46.9%
Cumulative Load Factor: 48.2%
Cumulative Unit Capability Factor: 56.5%
Cumulative Energy Unavailability Factor: 53.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2005	11870.4	1325	100.0	100.0	100.0	100.0	102.3	102.3	8760	100.0
2006	3385.2	1325	28.5	64.3	28.5	64.3	29.2	65.7	2515	28.7
2007	7652.7	1212	68.8	65.7	68.6	65.6	71.0	67.4	6159	70.3
2008	7516.3	1212	68.8	66.4	68.3	66.3	70.6	68.2	6075	69.2
2009	1338.3	1212	51.3	63.5	12.2	55.9	12.6	57.5	1076	12.3
2010	0.0	1212	20.0	56.5	0.0	46.9	0.0	48.2	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					2290	
C. Inspection, maintenance or repair combined with refuelling				878		
F. Major back-fitting, refurbishment or upgrading activities with refuelling	1536					
H. Nuclear regulatory requirements		5472				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			1752			685
Subtotal	1536	5472	1752	878	2290	685
Total		8760			3853	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
31. Turbine and auxiliaries		2290
Total	0	2290

JP-23 IKATA-1

Operator: SHIKOKU (SHIKOKU ELECTRIC POWER CO.,INC)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 538.0 MW(e)
Design Net Capacity: 538.0 MW(e)
Design Discharge Burnup: 51000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3953.0 GW(e).h
Energy Availability Factor: 83.3%
Load Factor: 83.9%
Operating Factor: 83.7%
Energy Unavailability Factor: 16.7%
Total Off-line Time: 1431 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	406.2	366.4	406.2	394.2	169.2	0.0	238.6	399.8	383.7	398.5	386.9	403.4	3953.0
EAF (%)	100.0	100.0	100.0	100.0	41.8	0.1	59.5	100.0	99.4	99.8	100.0	100.0	83.3
UCF (%)	100.0	100.0	100.0	100.0	41.8	0.1	59.5	100.0	100.0	100.0	100.0	100.0	83.4
LF (%)	101.5	101.3	101.5	101.8	42.3	0.0	59.6	99.9	99.1	99.6	99.9	100.8	83.9
OF (%)	100.0	100.0	100.0	100.0	41.9	0.0	62.5	100.0	100.0	100.0	100.0	100.0	83.7
EUUF (%)	0.0	0.0	0.0	0.0	58.2	99.9	40.5	0.0	0.6	0.2	0.0	0.0	16.7
PUF (%)	0.0	0.0	0.0	0.0	58.2	99.9	38.5	0.0	0.0	0.0	0.0	0.0	16.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING (2010/5/14-2010/7/12)

5. Historical Summary

Date of Construction Start: 09 Jan 1973
Date of First Criticality: 29/01/1977
Date of Grid Connection: 17/02/1977
Date of Commercial Operation: 30/09/1977

Lifetime Generation: 122481.0 GW(e).h
Cumulative Energy Availability Factor: 77.9%
Cumulative Load Factor: 78.0%
Cumulative Unit Capability Factor: 77.9%
Cumulative Energy Unavailability Factor: 22.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1977	1299.7	538	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	2680	91.5
1978	3138.0	538	66.6	70.6	66.6	70.6	66.6	70.6	66.6	70.6	6272	71.6
1979	2564.5	538	54.4	63.7	54.4	63.7	54.4	63.7	54.4	63.7	4984	56.9
1980	3127.4	538	66.2	64.4	66.2	64.4	66.2	64.4	66.2	64.4	6006	68.4
1981	3236.8	538	68.7	65.4	68.7	65.4	68.7	65.4	68.7	65.4	6253	71.4
1982	3527.3	538	74.8	67.2	74.8	67.2	74.8	67.2	74.8	67.2	6662	76.1
1983	4667.6	538	99.0	72.2	99.0	72.2	99.0	72.2	99.0	72.2	8754	99.9
1984	3318.2	538	70.5	72.0	70.5	72.0	70.2	71.9	70.2	71.9	6283	71.5
1985	3674.1	538	78.2	72.7	78.2	72.7	78.0	72.6	78.0	72.6	6962	79.5
1986	3719.6	538	79.2	73.4	79.2	73.4	78.9	73.3	78.9	73.3	7044	80.4
1987	4696.0	538	100.0	76.0	100.0	76.0	99.6	75.9	99.6	75.9	8760	100.0
1988	3533.9	538	75.0	75.9	75.0	75.9	74.8	75.8	74.8	75.8	6719	76.5
1989	3563.6	538	76.2	75.9	76.2	75.9	75.6	75.8	75.6	75.8	6791	77.5
1990	3632.2	538	76.4	75.9	76.4	75.9	77.1	75.9	77.1	75.9	6932	79.1
1991	4382.4	538	93.4	77.2	93.4	77.2	93.0	77.0	93.0	77.0	8184	93.4
1992	3675.4	538	78.5	77.3	78.5	77.3	77.8	77.1	77.8	77.1	6995	79.6
1993	3494.2	538	74.4	77.1	74.4	77.1	74.1	76.9	74.1	76.9	6630	75.7
1994	3601.3	538	76.6	77.0	76.6	77.0	76.4	76.9	76.4	76.9	6717	76.7
1995	3598.7	538	76.5	77.0	76.5	77.0	76.4	76.9	76.4	76.9	6815	77.8
1996	3579.1	538	75.9	77.0	75.9	77.0	75.7	76.8	75.7	76.8	6768	77.0
1997	4688.9	538	99.7	78.1	99.7	78.1	99.5	77.9	99.5	77.9	8760	100.0
1998	3239.2	538	68.9	77.7	68.9	77.7	68.7	77.5	68.7	77.5	6127	69.9
1999	3783.2	538	80.4	77.8	80.4	77.8	80.3	77.6	80.3	77.6	7051	80.5
2000	3194.1	538	67.7	77.3	67.7	77.3	67.6	77.2	67.6	77.2	5953	67.8
2001	4477.6	538	95.2	78.1	95.2	78.1	95.0	77.9	95.0	77.9	8412	96.0
2002	3527.9	538	74.2	77.9	74.2	77.9	74.9	77.8	74.9	77.8	6505	74.3
2003	3734.6	538	77.8	77.9	77.8	77.9	79.2	77.8	79.2	77.8	6819	77.8
2004	3249.6	538	67.6	77.5	67.6	77.5	68.8	77.5	68.8	77.5	5949	67.7
2005	4267.9	538	90.3	78.0	90.1	78.0	90.6	78.0	90.6	78.0	7949	90.7
2006	3461.2	538	73.2	77.8	73.2	77.8	73.4	77.8	73.4	77.8	6465	73.8
2007	3919.4	538	82.6	78.0	82.5	78.0	83.2	78.0	83.2	78.0	7259	82.9
2008	3980.2	538	84.0	78.2	83.7	78.2	84.2	78.2	84.2	78.2	7403	84.3
2009	3081.7	538	65.2	77.8	65.1	77.8	65.4	77.8	65.4	77.8	5731	65.4
2010	3953.0	538	83.4	77.9	83.3	77.9	83.9	78.0	83.9	78.0	7329	83.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					52	
C. Inspection, maintenance or repair combined with refuelling	1416			1727		
D. Inspection, maintenance or repair without refuelling				12		
E. Testing of plant systems or components		15				
J. Grid limitation, failure or grid unavailability						0
Z. Others					14	
Subtotal	1416	15	0	1739	66	0
Total		1431			1805	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		18
14. Safety Systems		0
31. Turbine and auxiliaries		28
42. Electrical Power Supply Systems		0
Total	0	51

JP-32 IKATA-2

Operator: SHIKOKU (SHIKOKU ELECTRIC POWER CO.,INC)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 538.0 MW(e)
Design Net Capacity: 538.0 MW(e)
Design Discharge Burnup: 51000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3717.8 GW(e).h
Energy Availability Factor: 78.0%
Load Factor: 78.9%
Operating Factor: 78.3%
Energy Unavailability Factor: 22.0%
Total Off-line Time: 1898 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	407.1	367.4	407.2	394.5	405.6	386.7	401.7	334.3	0.0	0.0	207.4	405.9	3717.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	99.4	100.0	83.7	0.1	0.1	53.3	100.0	78.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	99.4	100.0	83.7	0.1	0.1	53.3	100.0	78.0
LF (%)	101.7	101.6	101.7	101.8	101.3	99.8	100.4	83.5	0.0	0.0	53.5	101.4	78.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.9	0.0	0.0	56.4	100.0	78.3
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.6	0.0	16.3	99.9	99.9	46.7	0.0	22.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	99.9	99.9	46.7	0.0	21.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING (2010/8/27-2010/11/14)

5. Historical Summary

Date of Construction Start: 08 Jan 1978 **Lifetime Generation:** 110952.0 GW(e).h
Date of First Criticality: 31/07/1981 **Cumulative Energy Availability Factor:** 81.7%
Date of Grid Connection: 19/08/1981 **Cumulative Load Factor:** 81.7%
Date of Commercial Operation: 19/03/1982 **Cumulative Unit Capability Factor:** 81.7%
Cumulative Energy Unavailability Factor: 18.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	3893.9	538	98.6	98.6	98.6	98.6	98.6	98.6	7327	99.8
1983	3575.0	538	75.9	86.2	75.9	86.2	75.9	86.2	6798	77.6
1984	3776.6	538	80.3	84.1	80.1	84.1	79.9	84.0	7157	81.5
1985	3694.1	538	78.6	82.7	78.6	82.6	78.4	82.5	6995	79.9
1986	4698.6	538	100.0	86.3	100.0	86.2	99.7	86.1	8760	100.0
1987	3758.7	538	80.5	85.3	80.5	85.3	79.8	85.0	7137	81.5
1988	3541.5	538	75.1	83.8	75.1	83.8	74.9	83.5	6743	76.8
1989	3751.3	538	79.8	83.3	79.8	83.3	79.6	83.0	7128	81.4
1990	4694.9	538	99.9	85.2	99.9	85.2	99.6	84.9	8760	100.0
1991	3526.2	538	75.2	84.2	75.2	84.1	74.8	83.9	6731	76.8
1992	3479.9	538	74.3	83.3	74.3	83.2	73.6	82.9	6639	75.6
1993	3588.6	538	76.4	82.7	76.4	82.7	76.1	82.4	6799	77.6
1994	4700.6	538	99.9	84.0	99.9	84.0	99.7	83.7	8760	100.0
1995	3720.9	538	79.0	83.7	79.0	83.6	79.0	83.4	7014	80.1
1996	3664.8	538	77.7	83.3	77.7	83.2	77.5	83.0	6935	79.0
1997	3610.4	538	76.8	82.8	76.8	82.8	76.6	82.6	6831	78.0
1998	4701.1	538	99.9	83.9	99.9	83.8	99.7	83.6	8760	100.0
1999	3734.4	538	79.5	83.6	79.5	83.6	79.2	83.3	6973	79.6
2000	3695.0	538	78.3	83.3	78.3	83.3	78.2	83.1	6888	78.4
2001	3145.7	538	66.9	82.5	66.9	82.5	66.7	82.2	5875	67.1
2002	4718.5	538	99.2	83.3	99.2	83.3	100.1	83.1	8698	99.3
2003	3904.7	538	81.6	83.2	81.6	83.2	82.9	83.1	7150	81.6
2004	3611.9	538	76.1	82.9	75.8	82.9	76.4	82.8	6683	76.1
2005	3163.3	538	67.1	82.3	67.0	82.2	67.1	82.1	5890	67.2
2006	3329.2	538	70.4	81.8	70.3	81.8	70.6	81.7	6230	71.1
2007	4720.6	538	100.0	82.5	99.8	82.4	100.2	82.4	8760	100.0
2008	3897.6	538	82.6	82.5	82.3	82.4	82.5	82.4	7285	82.9
2009	3101.7	538	65.6	81.9	65.6	81.8	65.8	81.8	5778	66.0
2010	3717.8	538	78.0	81.7	78.0	81.7	78.9	81.7	6862	78.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					8	
C. Inspection, maintenance or repair combined with refuelling	1898			1470		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				5		
J. Grid limitation, failure or grid unavailability						0
Subtotal	1898	0	0	1475	8	0
Total		1898			1483	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		0
31. Turbine and auxiliaries		7
Total	0	7

JP-47 IKATA-3

Operator: SHIKOKU (SHIKOKU ELECTRIC POWER CO.,INC)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 846.0 MW(e)
 Design Net Capacity: 846.0 MW(e)
 Design Discharge Burnup: 49000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6490.7 GW(e).h
 Energy Availability Factor: 84.3%
 Load Factor: 87.6%
 Operating Factor: 84.6%
 Energy Unavailability Factor: 15.7%
 Total Off-line Time: 1350 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	125.6	0.0	567.2	636.1	656.8	635.0	654.0	651.8	627.2	649.2	632.3	655.5	6490.7
EAF (%)	19.2	0.1	86.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.3
UCF (%)	19.2	0.1	86.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.3
LF (%)	20.0	0.0	90.1	104.4	104.3	104.2	103.9	103.6	103.0	103.1	103.8	104.1	87.6
OF (%)	19.4	0.0	89.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.6
EUF (%)	80.8	99.9	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7
PUF (%)	80.8	89.2	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9
UCLF (%)	0.0	10.7	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING IKATA NO.3 STARTED USE OF THE MOX FUELS IN MARCH 2010.

5. Historical Summary

Date of Construction Start: 10 Jan 1990 Lifetime Generation: 105568.0 GW(e).h
 Date of First Criticality: 23/02/1994 Cumulative Energy Availability Factor: 86.2%
 Date of Grid Connection: 29/03/1994 Cumulative Load Factor: 88.7%
 Date of Commercial Operation: 15/12/1994 Cumulative Unit Capability Factor: 86.2%
 Cumulative Energy Unavailability Factor: 13.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	636.8	846	100.0	100.0	100.0	100.0	101.2	101.2	744	100.0
1995	7491.8	846	100.0	100.0	100.0	100.0	101.1	101.1	8760	100.0
1996	5578.2	846	74.2	87.6	74.2	87.6	75.1	88.6	6621	75.4
1997	6134.7	846	81.9	85.8	81.9	85.8	82.8	86.7	7242	82.7
1998	6250.4	846	83.4	85.2	83.4	85.2	84.3	86.1	7374	84.2
1999	6298.4	846	84.1	85.0	84.1	85.0	85.0	85.9	7368	84.1
2000	6660.3	846	88.7	85.6	88.7	85.6	89.6	86.5	7790	88.7
2001	6210.7	846	82.9	85.2	82.9	85.2	83.8	86.1	7267	83.0
2002	6599.5	846	85.8	85.3	85.8	85.3	89.1	86.5	7518	85.8
2003	5862.1	846	74.9	84.1	74.9	84.1	79.1	85.7	6560	74.9
2004	7828.9	846	100.0	85.7	100.0	85.7	105.4	87.6	8784	100.0
2005	6699.4	846	86.8	85.8	86.8	85.8	90.4	87.9	7637	87.2
2006	6134.6	846	79.5	85.3	79.5	85.3	82.8	87.5	6990	79.8
2007	6869.3	846	88.9	85.6	88.9	85.6	92.7	87.9	7813	89.2
2008	6393.0	846	82.6	85.4	82.6	85.4	86.0	87.7	7282	82.9
2009	7716.6	846	100.0	86.3	100.0	86.3	104.1	88.8	8760	100.0
2010	6490.7	846	84.3	86.2	84.3	86.2	87.6	88.7	7410	84.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1996 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					78	
C. Inspection, maintenance or repair combined with refuelling	1200			1108		
Z. Others		150				
Subtotal	1200	150	0	1108	78	0
Total		1350			1186	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1996 to 2010 Average Hours Lost Per Year
41. Main Generator Systems		16
42. Electrical Power Supply Systems		62
Total	0	78

JP-33 KASHIWAZAKI KARIWA-1

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5290.8 GW(e).h
 Energy Availability Factor: 56.3%
 Load Factor: 56.6%
 Operating Factor: 57.3%
 Energy Unavailability Factor: 43.7%
 Total Off-line Time: 3738 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	547.3	798.8	793.9	770.2	799.7	777.5	803.5	5290.8
EAF (%)	0.0	0.0	0.0	0.0	0.0	71.8	100.0	100.0	100.0	100.0	100.0	100.0	56.3
UCF (%)	0.0	0.0	0.0	0.0	0.0	71.8	100.0	100.0	100.0	100.0	100.0	100.0	56.3
LF (%)	0.0	0.0	0.0	0.0	0.0	71.2	100.6	100.0	100.3	100.7	101.2	101.2	56.6
OF (%)	0.0	0.0	0.0	0.0	0.0	84.2	100.0	100.0	100.0	100.0	100.0	100.0	57.3
EUf (%)	100.0	100.0	100.0	100.0	100.0	28.2	0.0	0.0	0.0	0.0	0.0	0.0	43.7
PUF (%)	100.0	100.0	100.0	100.0	100.0	28.2	0.0	0.0	0.0	0.0	0.0	0.0	43.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN JUNE THE REACTOR WAS RESTARTED FROM THE EXTENDED SHUTDOWN AFTER THE EARTHQUAKE IN 2007.

5. Historical Summary

Date of Construction Start: 06 May 1980 Lifetime Generation: 154527.0 GW(e).h
 Date of First Criticality: 12 Dec 1984 Cumulative Energy Availability Factor: 65.2%
 Date of Grid Connection: 13/02/1985 Cumulative Load Factor: 64.4%
 Date of Commercial Operation: 18/09/1985 Cumulative Unit Capability Factor: 66.3%
 Cumulative Energy Unavailability Factor: 34.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	2939.8	1067	100.0	100.0	100.0	100.0	94.1	94.1	2808	95.9
1986	6703.7	1067	73.0	79.8	73.0	79.8	71.7	77.3	6463	73.8
1987	9195.5	1067	100.0	88.4	100.0	88.4	98.4	86.3	8760	100.0
1988	6959.7	1067	75.0	84.4	75.0	84.4	74.3	82.7	6660	75.8
1989	6442.3	1067	69.7	81.0	69.7	81.0	68.9	79.5	6236	71.2
1990	5987.4	1067	65.0	78.0	65.0	78.0	64.1	76.6	5711	65.2
1991	9031.6	1067	97.9	81.1	97.9	81.1	96.6	79.8	8618	98.4
1992	6958.1	1067	75.8	80.4	75.4	80.4	74.2	79.0	6728	76.6
1993	6874.3	1067	74.7	79.7	74.7	79.7	73.5	78.4	6575	75.1
1994	7020.2	1067	76.1	79.3	76.1	79.3	75.1	78.0	6744	77.0
1995	9235.2	1067	100.0	81.3	100.0	81.3	98.8	80.0	8760	100.0
1996	6814.4	1067	73.6	80.7	73.6	80.6	72.7	79.4	6469	73.6
1997	7899.9	1067	85.7	81.1	85.7	81.0	84.5	79.8	7525	85.9
1998	6176.2	1067	67.4	80.0	67.4	80.0	66.1	78.8	5960	68.0
1999	9198.8	1067	99.7	81.4	99.7	81.4	98.4	80.1	8760	100.0
2000	7714.7	1067	83.6	81.6	83.6	81.5	82.3	80.3	7346	83.6
2001	7070.5	1067	76.9	81.3	76.9	81.2	75.6	80.0	6743	77.0
2002	5906.2	1067	64.2	80.3	64.2	80.3	63.2	79.0	5628	64.2
2003	0.0	1067	0.0	75.9	0.0	75.9	0.0	74.7	0	0.0
2004	6496.7	1067	69.2	75.6	69.2	75.5	69.3	74.4	6171	70.3
2005	3125.9	1067	33.5	73.5	33.5	73.5	33.4	72.4	3051	34.8
2006	6299.4	1067	67.1	73.2	67.1	73.2	67.4	72.2	5899	67.3
2007	3165.8	1067	62.1	72.7	33.6	71.4	33.9	70.5	2952	33.7
2008	0.0	1067	0.0	69.6	0.0	68.3	0.0	67.5	0	0.0
2009	0.0	1067	0.0	66.7	0.0	65.5	0.0	64.7	0	0.0
2010	5290.8	1067	56.3	66.3	56.3	65.2	56.6	64.4	5022	57.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					359	
C. Inspection, maintenance or repair combined with refuelling				1644		
D. Inspection, maintenance or repair without refuelling				34		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	3756			701		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						99
Z. Others					72	
Subtotal	3756	0	0	2379	431	99
Total		3756			2909	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		48
15. Reactor Cooling Systems		225
21. Fuel Handling and Storage Facilities		38
32. Feedwater and Main Steam System		37
41. Main Generator Systems		8
Total	0	356

JP-39 KASHIWAZAKI KARIWA-2

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
 Energy Availability Factor: 0.0%
 Load Factor: 0.0%
 Operating Factor: 0.0%
 Energy Unavailability Factor: 100.0%
 Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUFF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUFF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE REACTOR REMAINS IN AN EXTENDED OUTAGE AFTER THE EARTHQUAKE IN 2007.

5. Historical Summary

Date of Construction Start: 18/11/1985
 Date of First Criticality: 30/11/1989
 Date of Grid Connection: 02 Aug 1990
 Date of Commercial Operation: 28/09/1990
 Lifetime Generation: 120879.0 GW(e).h
 Cumulative Energy Availability Factor: 62.4%
 Cumulative Load Factor: 61.6%
 Cumulative Unit Capability Factor: 62.4%
 Cumulative Energy Unavailability Factor: 37.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	2935.8	1067	100.0	100.0	100.0	100.0	94.0	94.0	2813	96.1
1991	6642.4	1067	72.4	79.3	72.4	79.3	71.1	76.8	6440	73.5
1992	9046.9	1067	97.9	87.3	97.9	87.3	96.5	85.3	8623	98.2
1993	7212.6	1067	78.5	84.7	78.3	84.6	77.2	82.8	6911	78.9
1994	7291.1	1067	79.0	83.4	79.0	83.3	78.0	81.7	6962	79.5
1995	7696.8	1067	83.4	83.4	83.4	83.3	82.3	81.8	7329	83.7
1996	8811.1	1067	95.3	85.3	95.2	85.2	94.0	83.8	8396	95.6
1997	7284.4	1067	79.1	84.4	79.1	84.4	77.9	83.0	6913	78.9
1998	8142.1	1067	88.4	84.9	88.4	84.9	87.1	83.5	7769	88.7
1999	8208.8	1067	89.2	85.4	89.1	85.3	87.8	83.9	7814	89.2
2000	8140.0	1067	88.3	85.6	88.3	85.6	86.8	84.2	7760	88.3
2001	7595.5	1067	82.4	85.4	82.4	85.3	81.3	84.0	7223	82.5
2002	5866.2	1067	63.1	83.6	63.1	83.5	62.8	82.2	5532	63.2
2003	0.0	1067	0.0	77.3	0.0	77.3	0.0	76.1	0	0.0
2004	4660.3	1067	49.6	75.4	49.6	75.3	49.7	74.2	4361	49.6
2005	6388.4	1067	68.4	74.9	68.4	74.9	68.3	73.8	6035	68.9
2006	9330.8	1067	99.8	76.4	99.8	76.4	99.8	75.4	8760	100.0
2007	1830.3	1067	19.8	73.2	19.8	73.1	19.6	72.2	1786	20.4
2008	0.0	1067	0.0	69.2	0.0	69.1	0.0	68.3	0	0.0
2009	0.0	1067	0.0	65.6	0.0	65.6	0.0	64.7	0	0.0
2010	0.0	1067	0.0	62.4	0.0	62.4	0.0	61.6	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					545	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling				1404		
D. Inspection, maintenance or repair without refuelling				12		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	8760			877		
Z. Others					62	
Subtotal	8760	0	0	2293	616	0
Total		8760			2909	

7. Equipment Related Full Outages, Analysis by System

System	2010	1991 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		11
15. Reactor Cooling Systems		289
31. Turbine and auxiliaries		241
Total	0	543

JP-52 KASHIWAZAKI KARIWA-3

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
 Energy Availability Factor: 0.0%
 Load Factor: 0.0%
 Operating Factor: 0.0%
 Energy Unavailability Factor: 100.0%
 Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUf (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE REACTOR REMAINS IN AN EXTENDED OUTAGE AFTER THE EARTHQUAKE IN 2007.

5. Historical Summary

Date of Construction Start: 03 Jul 1989 Lifetime Generation: 100277.0 GW(e).h
 Date of First Criticality: 19/10/1992 Cumulative Energy Availability Factor: 60.4%
 Date of Grid Connection: 12 Aug 1992 Cumulative Load Factor: 59.9%
 Date of Commercial Operation: 08 Nov 1993 Cumulative Unit Capability Factor: 61.5%
 Cumulative Energy Unavailability Factor: 39.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	3875.8	1067	100.0	100.0	100.0	100.0	98.9	98.9	3672	100.0
1994	7264.4	1067	78.9	85.1	78.9	85.1	77.7	84.0	6961	79.5
1995	9253.9	1067	100.0	91.3	100.0	91.3	99.0	90.2	8760	100.0
1996	7921.6	1067	85.5	89.6	85.5	89.6	84.5	88.5	7508	85.5
1997	8016.2	1067	86.8	88.9	86.8	88.9	85.8	87.9	7601	86.8
1998	6748.0	1067	73.1	86.0	73.1	86.0	72.2	85.0	6467	73.8
1999	9028.3	1067	97.7	87.8	97.7	87.8	96.6	86.8	8568	97.8
2000	7945.1	1067	85.8	87.6	85.8	87.6	84.8	86.5	7539	85.8
2001	6985.7	1067	75.8	86.2	75.8	86.2	74.7	85.1	6639	75.8
2002	5575.5	1067	60.4	83.4	60.4	83.4	59.7	82.4	5300	60.5
2003	0.0	1067	0.0	75.4	0.0	75.4	0.0	74.5	0	0.0
2004	6550.0	1067	69.9	74.9	69.9	74.9	69.9	74.1	6093	69.4
2005	6061.7	1067	64.9	74.1	64.9	74.1	64.9	73.4	5772	65.9
2006	7331.4	1067	78.3	74.5	78.3	74.4	78.4	73.7	6924	79.0
2007	5054.1	1067	71.4	74.2	53.7	73.0	54.1	72.4	4714	53.8
2008	0.0	1067	0.0	69.4	0.0	68.3	0.0	67.7	0	0.0
2009	0.0	1067	0.0	65.2	0.0	64.1	0.0	63.6	0	0.0
2010	0.0	1067	0.0	61.5	0.0	60.4	0.0	59.9	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					492	
C. Inspection, maintenance or repair combined with refuelling				1337		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	8760			1032		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						91
Z. Others					81	
Subtotal	8760	0	0	2369	573	91
Total		8760			3033	

7. Equipment Related Full Outages, Analysis by System

System	2010	1994 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		460
15. Reactor Cooling Systems		32
Total	0	492

JP-53 KASHIWAZAKI KARIWA-4

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1067.0 MW(e)
Design Net Capacity: 1067.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE REACTOR REMAINS IN AN EXTENDED OUTAGE AFTER THE EARTHQUAKE IN 2007.

5. Historical Summary

Date of Construction Start: 03 May 1990 Lifetime Generation: 91851.0 GW(e).h
Date of First Criticality: 11 Jan 1993 Cumulative Energy Availability Factor: 58.9%
Date of Grid Connection: 21/12/1993 Cumulative Load Factor: 58.4%
Date of Commercial Operation: 08 Nov 1994 Cumulative Unit Capability Factor: 61.8%
Cumulative Energy Unavailability Factor: 41.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1994	3869.5	1067	99.8	99.8	99.8	99.8	98.8	98.8	3672	100.0
1995	6182.5	1067	67.0	76.7	67.0	76.7	66.1	75.8	5889	67.2
1996	8068.0	1067	87.1	81.0	87.1	81.0	86.1	80.0	7651	87.1
1997	7516.7	1067	81.7	81.2	81.5	81.1	80.4	80.2	7207	82.3
1998	9258.7	1067	100.0	85.4	100.0	85.4	99.1	84.4	8760	100.0
1999	8141.7	1067	88.1	85.9	88.1	85.9	87.1	84.9	7719	88.1
2000	6918.9	1067	75.1	84.2	75.1	84.2	73.8	83.2	6602	75.2
2001	5591.4	1067	60.6	81.1	60.6	81.0	59.8	80.0	5343	61.0
2002	9239.9	1067	100.0	83.3	99.9	83.3	98.9	82.3	8760	100.0
2003	4185.8	1067	45.0	79.2	45.0	79.2	44.8	78.3	3946	45.0
2004	5623.7	1067	59.9	77.4	59.9	77.3	60.0	76.5	5258	59.9
2005	7192.0	1067	76.8	77.3	76.8	77.3	76.9	76.6	6755	77.1
2006	2816.5	1067	31.0	73.6	30.4	73.5	30.1	72.8	2772	31.6
2007	5061.7	1067	100.0	75.6	53.8	72.1	54.2	71.4	4714	53.8
2008	0.0	1067	0.0	70.3	0.0	67.1	0.0	66.5	0	0.0
2009	0.0	1067	0.0	65.8	0.0	62.7	0.0	62.2	0	0.0
2010	0.0	1067	0.0	61.8	0.0	58.9	0.0	58.4	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					381	
C. Inspection, maintenance or repair combined with refuelling				1351	17	
G. Major back-fitting, refurbishment or upgrading activities without refuelling	8760			1096		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					39	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						252
Subtotal	8760	0	0	2447	437	252
Total		8760			3136	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1995 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		36
15. Reactor Cooling Systems		143
31. Turbine and auxiliaries		31
41. Main Generator Systems		116
42. Electrical Power Supply Systems		53
Total	0	379

JP-40 KASHIWAZAKI KARIWA-5

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1067.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 780.1 GW(e).h
 Energy Availability Factor: 8.6%
 Load Factor: 8.3%
 Operating Factor: 10.1%
 Energy Unavailability Factor: 91.4%
 Total Off-line Time: 7872 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.4	738.7	780.1
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	92.8	8.6
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	92.8	8.6
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	93.1	8.3
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	100.0	10.1
EUf (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.8	7.2	91.4
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.8	1.7	91.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN NOVEMBER THE REACTOR WAS RESTARTED FROM THE EXTENDED SHUTDOWN AFTER THE EARTHQUAKE IN 2007.

5. Historical Summary

Date of Construction Start: 20/06/1985 Lifetime Generation: 126977.0 GW(e).h
 Date of First Criticality: 20/07/1989 Cumulative Energy Availability Factor: 65.0%
 Date of Grid Connection: 09 Dec 1989 Cumulative Load Factor: 64.4%
 Date of Commercial Operation: 04 Oct 1990 Cumulative Unit Capability Factor: 67.5%
 Cumulative Energy Unavailability Factor: 35.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	6953.3	1067	100.0	100.0	100.0	100.0	98.7	98.7	6600	100.0
1991	7093.3	1067	76.7	86.7	76.7	86.7	75.9	85.7	6789	77.5
1992	6977.5	1067	75.5	82.6	75.5	82.6	74.4	81.6	6715	76.4
1993	9238.2	1067	99.9	87.2	99.9	87.2	98.8	86.2	8760	100.0
1994	7154.7	1067	77.5	85.2	77.5	85.2	76.5	84.2	6825	77.9
1995	7508.3	1067	81.5	84.5	81.5	84.5	80.3	83.5	7183	82.0
1996	7905.8	1067	85.6	84.7	85.6	84.7	84.4	83.6	7524	85.7
1997	8919.1	1067	96.6	86.2	96.6	86.2	95.4	85.1	8472	96.7
1998	7352.6	1067	79.6	85.5	79.6	85.5	78.7	84.4	6995	79.9
1999	7771.8	1067	84.3	85.4	84.3	85.4	83.1	84.3	7383	84.3
2000	7042.7	1067	76.4	84.5	76.3	84.5	75.1	83.4	6712	76.4
2001	9198.6	1067	99.6	85.8	99.6	85.8	98.4	84.7	8760	100.0
2002	8191.0	1067	88.3	86.0	88.3	86.0	87.6	84.9	7743	88.4
2003	1503.1	1067	16.1	80.9	16.1	80.9	16.1	79.9	1392	15.9
2004	6134.8	1067	65.3	79.9	65.3	79.8	65.5	78.9	5738	65.3
2005	6852.9	1067	73.0	79.4	73.0	79.4	73.3	78.6	6446	73.6
2006	8400.5	1067	89.5	80.0	89.5	80.0	89.9	79.3	7848	89.6
2007	0.0	1067	51.0	78.4	0.0	75.5	0.0	74.8	0	0.0
2008	0.0	1067	0.0	74.2	0.0	71.5	0.0	70.8	0	0.0
2009	0.0	1067	0.0	70.4	0.0	67.9	0.0	67.2	0	0.0
2010	780.1	1067	8.6	67.5	8.6	65.0	8.3	64.4	888	10.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					255	
C. Inspection, maintenance or repair combined with refuelling				1357		
D. Inspection, maintenance or repair without refuelling				11		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	7886			877		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						223
Z. Others					49	
Subtotal	7886	0	0	2245	304	223
Total		7886			2772	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1991 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
15. Reactor Cooling Systems			249
31. Turbine and auxiliaries			6
Total	0		255

JP-55 KASHIWAZAKI KARIWA-6

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1315.0 MW(e)
 Design Net Capacity: 1315.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9522.1 GW(e).h
 Energy Availability Factor: 80.6%
 Load Factor: 82.7%
 Operating Factor: 80.9%
 Energy Unavailability Factor: 19.4%
 Total Off-line Time: 1671 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	733.7	915.0	1012.5	979.9	1012.7	974.7	997.1	988.1	953.9	954.4	0.0	0.0	9522.1
EAF (%)	73.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.9	0.0	0.0	80.6
UCF (%)	73.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.8	95.9	0.0	0.0	80.6
LF (%)	75.0	103.5	103.5	103.5	103.5	102.9	101.9	101.0	100.8	97.6	0.0	0.0	82.7
OF (%)	75.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.8	0.0	0.0	80.9
EUUF (%)	26.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.1	100.0	100.0	19.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.1	100.0	100.0	17.1
UCLF (%)	26.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 11 Mar 1992
 Date of First Criticality: 18/12/1995
 Date of Grid Connection: 29/01/1996
 Date of Commercial Operation: 11 Jul 1996

Lifetime Generation: 119865.0 GW(e).h
 Cumulative Energy Availability Factor: 70.5%
 Cumulative Load Factor: 71.2%
 Cumulative Unit Capability Factor: 73.4%
 Cumulative Energy Unavailability Factor: 29.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1996	1920.8	1315	100.0	100.0	100.0	100.0	99.8	99.8	1464	100.0
1997	10161.5	1315	88.4	90.1	88.4	90.1	88.2	89.9	7752	88.5
1998	10702.3	1315	93.3	91.6	93.3	91.6	92.9	91.3	8217	93.8
1999	9710.4	1315	84.8	89.4	84.8	89.4	84.3	89.1	7480	85.4
2000	9411.6	1315	81.8	87.6	81.8	87.6	81.5	87.2	7183	81.8
2001	9270.0	1315	80.7	86.3	80.7	86.3	80.5	85.9	7079	80.8
2002	11504.1	1315	100.0	88.5	100.0	88.5	99.9	88.2	8760	100.0
2003	8401.2	1315	71.5	86.1	71.5	86.1	72.9	86.1	6163	70.4
2004	8635.2	1315	72.7	84.5	72.7	84.5	74.8	84.7	6410	73.0
2005	11126.5	1315	93.9	85.5	93.9	85.5	96.6	86.0	8232	94.0
2006	8446.7	1315	71.4	84.1	71.4	84.1	73.3	84.7	6301	71.9
2007	3758.2	1315	73.0	83.1	31.6	79.4	32.6	80.1	2787	31.8
2008	0.0	1315	0.0	76.3	0.0	72.9	0.0	73.5	0	0.0
2009	3653.8	1315	30.9	72.8	30.9	69.7	31.7	70.3	2818	32.2
2010	9522.1	1315	80.6	73.4	80.6	70.5	82.7	71.2	7089	80.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1997 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		184			108	
C. Inspection, maintenance or repair combined with refuelling	1488			958		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				1043		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						258
Z. Others					116	
Subtotal	1488	184	0	2001	224	258
Total		1672			2483	

7. Equipment Related Full Outages, Analysis by System

System	2010	1997 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	184	10
13. Reactor Auxiliary Systems		6
21. Fuel Handling and Storage Facilities		24
32. Feedwater and Main Steam System		46
41. Main Generator Systems		15
42. Electrical Power Supply Systems		7
Total	184	108

JP-56 KASHIWAZAKI KARIWA-7

Operator: TEPCO (TOKYO ELECTRIC POWER CO.,INC.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1315.0 MW(e)
 Design Net Capacity: 1315.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9033.9 GW(e).h
 Energy Availability Factor: 77.2%
 Load Factor: 78.4%
 Operating Factor: 80.4%
 Energy Unavailability Factor: 22.8%
 Total Off-line Time: 1719 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1003.4	906.3	996.1	536.5	0.0	42.9	970.7	985.3	790.4	992.7	850.3	959.3	9033.9
EAF (%)	100.0	100.0	99.5	55.8	0.0	4.2	98.2	100.0	83.6	100.0	88.7	96.6	77.2
UCF (%)	100.0	100.0	99.5	55.8	0.0	4.2	98.2	100.0	83.6	100.0	88.7	96.6	77.2
LF (%)	102.6	102.6	101.8	56.7	0.0	4.5	99.2	100.7	83.5	101.5	89.8	98.1	78.4
OF (%)	100.0	100.0	100.0	56.7	0.0	7.9	100.0	100.0	100.0	100.0	100.0	100.0	80.4
EUf (%)	0.0	0.0	0.5	44.2	100.0	95.8	1.8	0.0	16.4	0.0	11.3	3.4	22.8
PUf (%)	0.0	0.0	0.5	44.2	100.0	95.8	1.8	0.0	0.0	0.0	0.8	0.7	20.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	0.0	10.5	2.7	2.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 07 Jan 1993
 Date of First Criticality: 11 Jan 1996
 Date of Grid Connection: 17/12/1996
 Date of Commercial Operation: 07 Feb 1997

Lifetime Generation: 109062.0 GW(e).h
 Cumulative Energy Availability Factor: 68.0%
 Cumulative Load Factor: 68.6%
 Cumulative Unit Capability Factor: 70.7%
 Cumulative Energy Unavailability Factor: 32.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1997	5792.8	1315	100.0	100.0	100.0	100.0	99.8	99.8	4416	100.0
1998	9715.6	1315	84.7	89.8	84.7	89.8	84.3	89.5	7452	85.1
1999	8445.4	1315	73.7	83.4	73.7	83.4	73.3	83.0	6458	73.7
2000	11240.2	1315	97.6	87.4	97.6	87.4	97.3	87.1	8587	97.8
2001	10078.4	1315	87.8	87.5	87.8	87.5	87.5	87.2	7752	88.5
2002	7990.0	1315	69.5	84.2	68.9	84.1	69.4	84.0	6089	69.5
2003	5778.5	1315	49.2	78.9	49.2	78.8	50.2	78.8	4302	49.1
2004	10805.2	1315	94.5	80.9	91.6	80.5	93.5	80.7	8057	91.7
2005	7977.5	1315	68.0	79.4	68.0	79.0	69.3	79.4	6007	68.6
2006	8166.2	1315	69.9	78.4	69.5	78.0	70.9	78.5	6250	71.3
2007	6358.6	1315	87.1	79.2	53.8	75.7	55.2	76.3	4714	53.8
2008	0.0	1315	0.0	72.3	0.0	69.1	0.0	69.6	0	0.0
2009	5366.3	1315	45.8	70.2	45.8	67.3	46.6	67.8	4338	49.5
2010	9033.9	1315	77.2	70.7	77.2	68.0	78.4	68.6	7041	80.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1998 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					240	
C. Inspection, maintenance or repair combined with refuelling	1728			1114		
D. Inspection, maintenance or repair without refuelling				74		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				86		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				933		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						243
Z. Others					29	
Subtotal	1728	0	0	2207	269	243
Total		1728			2719	

7. Equipment Related Full Outages, Analysis by System

System	2010	1998 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		83
12. Reactor I&C Systems		72
15. Reactor Cooling Systems		84
Total	0	239

JP-4 MIHAMA-1

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 320.0 MW(e)
Design Net Capacity: 320.0 MW(e)
Design Discharge Burnup: 31500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2521.4 GW(e).h
Energy Availability Factor: 88.3%
Load Factor: 89.9%
Operating Factor: 89.7%
Energy Unavailability Factor: 11.7%
Total Off-line Time: 901 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	247.5	223.8	247.3	239.1	246.3	234.2	235.3	220.9	210.2	235.8	181.1	0.0	2521.4
EAFF (%)	99.9	99.9	99.9	99.9	99.9	99.9	99.9	92.7	91.2	99.9	77.6	0.0	88.3
UCF (%)	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	100.0	99.9	77.6	0.0	89.6
LF (%)	104.0	104.1	103.9	103.8	103.4	101.6	98.8	92.8	91.2	99.0	78.6	0.0	89.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	78.2	0.0	89.7
EUFF (%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	7.3	8.8	0.1	22.4	100.0	11.7
PUFF (%)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	22.4	100.0	10.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	8.8	0.0	0.0	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/11/24-)

5. Historical Summary

Date of Construction Start: 02 Jan 1967
Date of First Criticality: 29/07/1970
Date of Grid Connection: 08 Aug 1970
Date of Commercial Operation: 28/11/1970

Lifetime Generation: 60115.0 GW(e).h
Cumulative Energy Availability Factor: 52.7%
Cumulative Load Factor: 53.5%
Cumulative Unit Capability Factor: 52.9%
Cumulative Energy Unavailability Factor: 47.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1970	337.0	320	100.0	100.0	100.0	100.0	71.9	71.9	1017	69.5
1971	1953.8	320	100.0	100.0	100.0	100.0	69.7	70.0	5977	68.2
1972	1260.0	320	47.8	75.9	47.4	75.7	44.8	58.4	4156	47.3
1973	945.3	320	47.9	67.1	47.9	66.9	33.7	50.6	4865	55.5
1974	391.8	320	20.9	56.0	20.9	55.9	14.0	41.8	2151	24.6
1975	0.0	320	0.0	45.2	0.0	45.1	0.0	33.7	0	0.0
1976	0.0	320	0.0	37.8	0.0	37.8	0.0	28.2	0	0.0
1977	0.0	320	0.0	32.6	0.0	32.5	0.0	24.3	0	0.0
1978	118.7	320	4.2	29.1	4.2	29.0	4.2	21.9	1059	12.1
1979	115.4	320	4.1	26.4	4.1	26.3	4.1	19.9	1014	11.6
1980	1012.9	320	36.0	27.3	36.0	27.3	36.0	21.5	4472	50.9
1981	1178.1	320	42.0	28.6	42.0	28.6	42.0	23.3	3931	44.9
1982	92.8	320	3.3	26.6	3.3	26.5	3.3	21.7	455	5.2
1983	1164.4	320	41.5	27.7	41.5	27.7	41.5	23.2	3731	42.6
1984	1576.6	320	56.0	29.7	56.0	29.7	56.1	25.5	5053	57.5
1985	2240.2	320	80.0	33.0	80.0	33.0	79.9	29.1	7077	80.8
1986	2707.2	320	96.6	36.9	96.3	36.9	96.6	33.3	8482	96.8
1987	2261.5	320	81.6	39.5	81.6	39.5	80.7	36.0	7150	81.6
1988	2075.4	320	75.4	41.5	75.4	41.5	73.8	38.1	6623	75.4
1989	1693.2	320	61.8	42.6	61.8	42.5	60.4	39.3	5418	61.8
1990	1938.2	320	66.9	43.8	66.9	43.7	69.1	40.8	6058	69.2
1991	2371.9	320	8.8	42.1	4.5	41.9	84.6	42.8	7615	86.9
1992	1041.1	320	37.2	41.9	37.2	41.7	37.0	42.6	3511	40.0
1993	1663.3	320	58.5	42.6	58.5	42.4	59.3	43.3	5300	60.5
1994	369.9	320	13.4	41.4	13.4	41.2	13.2	42.1	1160	13.2
1995	0.0	320	0.0	39.8	0.0	39.6	0.0	40.4	0	0.0
1996	2245.9	320	79.7	41.3	79.7	41.1	79.9	41.9	7186	81.8
1997	2271.5	320	80.8	42.7	80.8	42.6	81.0	43.3	7083	80.9
1998	2321.5	320	82.5	44.2	82.5	44.0	82.8	44.7	7304	83.4
1999	2530.4	320	90.0	45.7	90.0	45.6	90.3	46.3	8013	91.5
2000	2381.2	320	84.6	47.0	84.5	46.9	84.7	47.6	7439	84.7
2001	2104.4	320	75.0	47.9	74.9	47.8	75.1	48.5	6574	75.0
2002	2158.6	320	77.1	48.8	76.6	48.7	77.0	49.3	6767	77.2
2003	2880.6	320	99.9	50.4	99.9	50.2	102.8	51.0	8760	100.0
2004	1764.2	320	61.3	50.7	61.3	50.5	62.8	51.3	5389	61.4
2005	1194.9	320	41.4	50.4	41.4	50.3	42.6	51.1	4022	45.9
2006	2353.3	320	83.3	51.3	83.3	51.2	84.0	52.0	7305	83.4
2007	854.7	320	30.3	50.8	30.3	50.6	30.5	51.4	2723	31.1
2008	2119.5	320	74.7	51.4	74.7	51.2	75.4	52.0	6561	74.7
2009	2070.1	320	72.2	51.9	72.2	51.8	73.8	52.6	6390	72.9
2010	2521.4	320	89.6	52.9	88.3	52.7	89.9	53.5	7859	89.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					1723	
C. Inspection, maintenance or repair combined with refuelling	901			1778		
D. Inspection, maintenance or repair without refuelling				274		
E. Testing of plant systems or components				0	3	
J. Grid limitation, failure or grid unavailability						2
Z. Others					107	
Subtotal	901	0	0	2052	1833	2
Total		901			3887	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		12
14. Safety Systems		83
15. Reactor Cooling Systems		55
16. Steam generation systems		1401
31. Turbine and auxiliaries		116
32. Feedwater and Main Steam System		40
42. Electrical Power Supply Systems		0
Total	0	1713

JP-6 MIHAMA-2

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 470.0 MW(e)
 Design Net Capacity: 470.0 MW(e)
 Design Discharge Burnup: 33300 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2356.3 GW(e).h
 Energy Availability Factor: 56.3%
 Load Factor: 57.2%
 Operating Factor: 58.2%
 Energy Unavailability Factor: 43.7%
 Total Off-line Time: 3661 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	357.0	322.3	215.6	179.5	0.0	0.3	333.9	210.1	0.0	34.3	344.9	358.3	2356.3
EAF (%)	99.9	99.9	60.4	52.0	0.0	0.1	94.5	60.2	0.0	10.2	100.0	99.9	56.3
UCF (%)	99.9	99.9	60.4	52.0	0.0	0.1	97.5	62.2	0.0	10.2	100.0	99.9	56.7
LF (%)	102.1	102.0	61.7	53.1	0.0	0.1	95.5	60.1	0.0	9.8	101.9	102.5	57.2
OF (%)	100.0	100.0	60.9	55.3	0.0	1.1	100.0	62.8	0.0	20.0	100.0	100.0	58.2
EUf (%)	0.1	0.1	39.6	48.0	100.0	99.9	5.5	39.8	100.0	89.8	0.0	0.1	43.7
PUf (%)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	37.8	100.0	89.8	0.0	0.1	19.1
UCLF (%)	0.0	0.0	39.7	48.0	100.0	99.9	2.5	0.0	0.0	0.0	0.0	0.0	24.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/8/20-2010/10/25)

5. Historical Summary

Date of Construction Start: 29/05/1968
 Date of First Criticality: 04 Oct 1972
 Date of Grid Connection: 21/04/1972
 Date of Commercial Operation: 25/07/1972
 Lifetime Generation: 97737.0 GW(e).h
 Cumulative Energy Availability Factor: 61.6%
 Cumulative Load Factor: 61.7%
 Cumulative Unit Capability Factor: 61.6%
 Cumulative Energy Unavailability Factor: 38.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	1318.0	492	67.5	67.5	67.5	67.5	59.7	59.7	3212	72.7
1973	2509.3	470	63.3	64.8	63.3	64.8	60.9	60.5	5569	63.6
1974	3122.8	470	77.0	69.6	77.0	69.6	75.8	66.6	6766	77.2
1975	260.3	470	6.4	51.7	6.4	51.7	6.3	49.5	818	9.3
1976	2828.2	470	68.7	55.5	68.7	55.5	68.5	53.7	7011	79.8
1977	1648.0	470	40.0	52.7	40.0	52.7	40.0	51.2	3679	42.0
1978	2648.7	470	64.5	54.5	64.5	54.5	64.3	53.2	5852	66.8
1979	867.1	470	21.1	50.1	21.1	50.1	21.1	49.0	1944	22.2
1980	3032.7	470	73.3	52.8	73.3	52.8	73.5	51.9	6622	75.4
1981	2762.9	470	66.9	54.3	66.9	54.3	67.1	53.4	5982	68.3
1982	2238.9	470	54.2	54.3	54.2	54.3	54.4	53.5	4958	56.6
1983	1433.8	470	34.7	52.6	34.7	52.6	34.8	51.9	3262	37.2
1984	3937.3	470	96.3	56.1	96.3	56.1	95.4	55.4	8458	96.3
1985	2898.3	470	70.2	57.1	70.2	57.1	70.4	56.5	6219	71.0
1986	3301.5	470	80.2	58.7	80.0	58.7	80.2	58.1	7100	81.1
1987	2766.2	470	67.7	59.3	67.7	59.3	67.2	58.7	5927	67.7
1988	3223.1	470	77.8	60.4	77.8	60.4	78.1	59.9	6850	78.0
1989	3325.2	470	81.2	61.6	81.2	61.6	80.8	61.1	7112	81.2
1990	3077.1	470	72.7	62.2	72.7	62.2	74.7	61.8	6594	75.3
1991	447.1	470	10.0	59.5	10.0	59.5	10.9	59.2	950	10.8
1992	0.0	470	0.0	56.6	0.0	56.6	0.0	56.3	0	0.0
1993	0.0	470	0.0	54.0	0.0	54.0	0.0	53.7	0	0.0
1994	1186.3	470	29.9	52.9	29.9	52.9	28.8	52.6	2522	28.8
1995	3335.0	470	80.7	54.1	80.5	54.1	81.0	53.8	7138	81.5
1996	3762.4	470	90.6	55.6	90.5	55.6	91.1	55.3	8024	91.3
1997	3006.0	470	72.6	56.2	72.6	56.2	73.0	56.0	6417	73.3
1998	3396.3	470	82.0	57.2	82.0	57.2	82.5	57.0	7228	82.5
1999	2746.4	470	66.3	57.5	66.3	57.5	66.7	57.4	5821	66.4
2000	3839.7	470	92.5	58.8	92.5	58.8	93.0	58.6	8137	92.6
2001	2911.3	470	70.4	59.2	70.3	59.1	70.7	59.0	6177	70.5
2002	3611.3	470	87.2	60.1	87.2	60.1	87.7	60.0	7648	87.3
2003	3400.2	470	81.5	60.8	81.5	60.7	82.6	60.7	7182	82.0
2004	2942.3	470	70.2	61.1	70.2	61.0	71.3	61.0	6170	70.2
2005	3525.4	470	84.8	61.8	84.8	61.7	85.6	61.7	7470	85.3
2006	3110.9	470	75.0	62.1	75.0	62.1	75.6	62.1	6671	76.2
2007	2294.2	470	54.8	61.9	54.8	61.9	55.7	62.0	4811	54.9
2008	1713.1	470	41.6	61.4	41.6	61.4	41.5	61.4	3678	41.9
2009	3161.6	470	75.8	61.8	75.8	61.7	76.8	61.8	6688	76.3
2010	2356.3	470	56.7	61.6	56.3	61.6	57.2	61.7	5099	58.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2070			453	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1592			2490	38	
D. Inspection, maintenance or repair without refuelling				80		
J. Grid limitation, failure or grid unavailability						0
Z. Others					67	
Subtotal	1592	2070	0	2570	558	0
Total		3662			3128	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	1623	
13. Reactor Auxiliary Systems	447	46
15. Reactor Cooling Systems		3
16. Steam generation systems		352
31. Turbine and auxiliaries		23
32. Feedwater and Main Steam System		0
41. Main Generator Systems		3
42. Electrical Power Supply Systems		23
Total	2070	450

JP-14 MIHAMA-3

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 780.0 MW(e)
 Design Net Capacity: 780.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5541.0 GW(e).h
 Energy Availability Factor: 77.4%
 Load Factor: 81.1%
 Operating Factor: 77.9%
 Energy Unavailability Factor: 22.6%
 Total Off-line Time: 1937 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	144.9	592.7	613.1	590.3	604.2	598.2	582.0	608.8	592.9	613.9	5541.0
EAF (%)	0.0	0.0	24.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	77.4
UCF (%)	0.0	0.0	24.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	77.4
LF (%)	0.0	0.0	25.0	105.5	105.7	105.1	104.1	103.1	103.6	104.9	105.6	105.8	81.1
OF (%)	0.0	0.0	30.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	77.9
EUF (%)	100.0	100.0	75.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6
PUF (%)	100.0	100.0	75.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2009/12/13-2010/03/22)

5. Historical Summary

Date of Construction Start: 08 Jul 1972
 Date of First Criticality: 28/01/1976
 Date of Grid Connection: 19/02/1976
 Date of Commercial Operation: 12 Jan 1976
 Lifetime Generation: 166213.0 GW(e).h
 Cumulative Energy Availability Factor: 70.6%
 Cumulative Load Factor: 71.3%
 Cumulative Unit Capability Factor: 70.6%
 Cumulative Energy Unavailability Factor: 29.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1976	493.6	780	85.1	85.1	85.1	85.1	85.1	85.1	85.1	744	100.0	
1977	4498.5	780	65.8	67.4	65.8	67.4	65.8	67.4	65.8	67.3	6159	70.3
1978	4166.6	780	59.5	63.6	59.5	63.6	61.0	64.3	61.0	64.3	5537	63.2
1979	1697.4	780	24.8	51.0	24.8	51.0	24.8	51.5	24.8	51.5	2307	26.3
1980	4597.7	780	67.0	55.0	67.0	55.0	67.1	55.3	67.1	55.3	5964	67.9
1981	5832.9	780	85.2	60.9	85.2	60.9	85.4	61.2	85.4	61.2	7607	86.8
1982	5239.1	780	76.4	63.4	76.4	63.4	76.7	63.8	76.7	63.8	6952	79.4
1983	4818.0	780	70.6	64.4	70.6	64.4	70.5	64.7	70.5	64.7	6330	72.3
1984	5353.7	780	77.8	66.1	77.8	66.1	78.1	66.4	78.1	66.4	6906	78.6
1985	4971.9	780	72.6	66.8	72.6	66.8	72.8	67.1	72.8	67.1	6426	73.4
1986	6848.4	780	99.8	70.1	99.8	70.1	100.2	70.4	100.2	70.4	8760	100.0
1987	4822.7	780	71.6	70.2	71.6	70.2	70.6	70.4	70.6	70.4	6268	71.6
1988	4261.3	780	64.0	69.7	64.0	69.7	62.2	69.7	62.2	69.7	5625	64.0
1989	5299.7	780	78.0	70.3	78.0	70.3	77.6	70.3	77.6	70.3	6834	78.0
1990	6867.0	780	100.0	72.4	100.0	72.4	100.5	72.5	100.5	72.5	8760	100.0
1991	4246.2	780	59.7	71.6	59.7	71.6	62.1	71.8	62.1	71.8	5495	62.7
1992	4709.9	780	68.5	71.4	68.5	71.4	68.7	71.6	68.7	71.6	6095	69.4
1993	4526.6	780	66.4	71.1	66.4	71.1	66.2	71.3	66.2	71.3	5951	67.9
1994	6623.0	780	96.8	72.5	96.8	72.5	96.9	72.7	96.9	72.7	8486	96.9
1995	3389.2	780	49.7	71.3	49.6	71.3	49.6	71.5	49.6	71.5	4534	51.8
1996	4491.4	780	65.5	71.1	65.3	71.0	65.6	71.2	65.6	71.2	5760	65.6
1997	6262.8	780	91.2	72.0	91.2	72.0	91.7	72.2	91.7	72.2	7963	90.9
1998	5979.9	780	87.1	72.7	87.1	72.7	87.5	72.8	87.5	72.8	7788	88.9
1999	5795.3	780	84.4	73.2	84.4	73.2	84.8	73.4	84.8	73.4	7398	84.5
2000	4785.0	780	69.6	73.1	69.6	73.0	69.8	73.2	69.8	73.2	6117	69.6
2001	6853.7	780	100.0	74.1	100.0	74.1	100.3	74.3	100.3	74.3	8760	100.0
2002	5248.0	780	76.8	74.2	76.8	74.2	76.8	74.4	76.8	74.4	6732	76.8
2003	6111.5	780	87.9	74.7	87.9	74.7	89.4	74.9	89.4	74.9	7701	87.9
2004	4301.3	780	60.5	74.2	60.5	74.2	62.8	74.5	62.8	74.5	5319	60.6
2005	0.0	780	0.0	71.7	0.0	71.7	0.0	72.0	0.0	72.0	0	0.0
2006	92.1	780	1.4	69.3	1.4	69.3	1.3	69.6	1.3	69.6	181	2.1
2007	4943.9	780	69.5	69.3	69.5	69.3	72.4	69.7	72.4	69.7	6190	70.7
2008	5725.5	780	79.7	69.7	79.7	69.6	83.6	70.1	83.6	70.1	7049	80.2
2009	6795.5	780	94.9	70.4	94.9	70.4	99.5	71.0	99.5	71.0	8315	94.9
2010	5541.0	780	77.4	70.6	77.4	70.6	81.1	71.3	81.1	71.3	6823	77.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					125	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1937			2240		
E. Testing of plant systems or components				0	3	
Subtotal	1937	0	0	2240	135	0
Total		1937			2375	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		31
15. Reactor Cooling Systems		10
16. Steam generation systems		27
32. Feedwater and Main Steam System		51
Total	0	119

JP-15 OHI-1

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 1120.0 MW(e)
Design Net Capacity: 1120.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6540.1 GW(e).h
Energy Availability Factor: 66.1%
Load Factor: 66.7%
Operating Factor: 66.5%
Energy Unavailability Factor: 33.9%
Total Off-line Time: 2936 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	847.1	132.9	0.0	0.0	359.3	815.3	837.0	831.2	805.1	840.2	818.9	253.1	6540.1
EAF (%)	100.0	17.4	0.0	0.0	42.5	100.0	100.0	100.0	100.0	100.0	100.0	29.8	66.1
UCF (%)	100.0	17.4	0.0	0.0	42.5	100.0	100.0	100.0	100.0	100.0	100.0	29.8	66.1
LF (%)	101.7	17.7	0.0	0.0	43.1	101.1	100.4	99.8	99.8	100.8	101.6	30.4	66.7
OF (%)	100.0	18.0	0.0	0.0	45.8	100.0	100.0	100.0	100.0	100.0	100.0	30.4	66.5
EUf (%)	0.0	82.6	100.0	100.0	57.5	0.0	0.0	0.0	0.0	0.0	0.0	70.2	33.9
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.2	6.0
UCLF (%)	0.0	82.6	100.0	100.0	57.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/12/10-)

5. Historical Summary

Date of Construction Start: 26/10/1972
Date of First Criticality: 12 Feb 1977
Date of Grid Connection: 23/12/1977
Date of Commercial Operation: 27/03/1979

Lifetime Generation: 209925.0 GW(e).h
Cumulative Energy Availability Factor: 66.6%
Cumulative Load Factor: 67.2%
Cumulative Unit Capability Factor: 66.7%
Cumulative Energy Unavailability Factor: 33.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	3900.2	1120	47.3	47.3	47.3	47.3	47.4	47.4	3701	50.4
1980	3890.5	1120	39.3	42.9	39.3	42.9	39.5	43.1	3635	41.4
1981	3035.4	1120	30.9	38.7	30.9	38.7	30.9	38.8	2938	33.5
1982	6659.8	1120	67.5	46.2	67.5	46.2	67.9	46.4	6076	69.4
1983	8212.6	1120	83.0	53.8	83.0	53.8	83.7	54.1	7282	83.1
1984	7015.1	1120	70.8	56.7	70.8	56.7	71.3	57.1	6292	71.6
1985	5794.1	1120	59.0	57.0	58.7	57.0	59.1	57.3	5217	59.6
1986	5138.8	1120	52.2	56.4	52.2	56.4	52.4	56.7	4664	53.2
1987	9421.7	1120	95.3	60.8	95.3	60.8	96.0	61.2	8430	96.2
1988	3282.4	1120	34.8	58.2	34.8	58.1	33.4	58.3	3053	34.8
1989	2744.9	1120	29.5	55.5	29.5	55.5	28.0	55.5	2587	29.5
1990	5446.5	1120	52.9	55.3	52.9	55.3	55.5	55.5	4919	56.2
1991	5706.3	1120	55.8	55.3	55.8	55.3	58.2	55.7	5160	58.9
1992	5488.2	1120	55.5	55.3	55.4	55.3	55.8	55.7	4957	56.4
1993	5010.3	1120	50.7	55.0	50.7	55.0	51.1	55.4	4535	51.8
1994	6929.9	1120	70.2	56.0	69.9	55.9	70.6	56.4	6202	70.8
1995	6537.9	1120	66.1	56.6	66.1	56.6	66.6	57.0	6010	68.6
1996	7026.3	1120	70.7	57.4	70.7	57.3	71.4	57.8	6305	71.8
1997	7998.8	1120	80.8	58.6	80.7	58.6	81.5	59.1	7080	80.8
1998	9406.5	1120	95.0	60.5	95.0	60.4	95.9	60.9	8359	95.4
1999	6933.7	1120	70.0	60.9	70.0	60.9	70.7	61.4	6136	70.0
2000	6323.6	1120	63.7	61.0	63.6	61.0	64.3	61.5	5668	64.5
2001	9333.1	1120	94.5	62.5	94.2	62.5	95.1	63.0	8273	94.4
2002	7935.8	1120	80.3	63.3	80.2	63.2	80.9	63.7	7038	80.3
2003	8118.7	1120	81.8	64.0	81.8	63.9	82.7	64.5	7142	81.5
2004	7777.0	1120	77.7	64.5	77.7	64.5	79.1	65.1	6825	77.7
2005	7272.5	1120	75.1	64.9	75.1	64.9	74.1	65.4	6510	74.3
2006	9628.3	1120	97.3	66.1	97.3	66.0	98.1	66.6	8530	97.4
2007	6522.9	1120	65.5	66.1	65.5	66.0	66.5	66.6	5796	66.2
2008	8316.9	1120	83.3	66.6	83.3	66.6	84.5	67.2	7344	83.6
2009	6817.3	1120	68.6	66.7	68.6	66.7	69.5	67.3	6040	68.9
2010	6540.1	1120	66.1	66.7	66.1	66.6	66.7	67.2	5824	66.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2419			304	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	518			2373		
E. Testing of plant systems or components				44		
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						0
Z. Others					17	
Subtotal	518	2419	0	2417	323	5
Total		2937			2745	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	2419	1
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		2
14. Safety Systems		6
15. Reactor Cooling Systems		31
16. Steam generation systems		206
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		11
42. Electrical Power Supply Systems		2
Total	2419	279

JP-19 OHI-2

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 1120.0 MW(e)
Design Net Capacity: 1120.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5483.8 GW(e).h
Energy Availability Factor: 54.2%
Load Factor: 55.9%
Operating Factor: 54.8%
Energy Unavailability Factor: 45.8%
Total Off-line Time: 3957 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	91.8	775.6	859.2	833.3	855.6	172.8	0.0	0.0	0.0	198.0	834.5	862.7	5483.8
EAF (%)	10.9	100.0	100.0	100.0	100.0	20.8	0.0	0.0	0.0	23.2	100.0	100.0	54.2
UCF (%)	10.9	100.0	100.0	100.0	100.0	20.8	0.0	0.0	0.0	23.3	100.0	100.0	54.2
LF (%)	11.0	103.1	103.1	103.3	102.7	21.4	0.0	0.0	0.0	23.8	103.5	103.5	55.9
OF (%)	14.2	100.0	100.0	100.0	100.0	21.4	0.0	0.0	0.0	26.7	100.0	100.0	54.8
EUf (%)	89.1	0.0	0.0	0.0	0.0	79.2	100.0	100.0	100.0	76.8	0.0	0.0	45.8
PUf (%)	0.0	0.0	0.0	0.0	0.0	79.2	100.0	100.0	100.0	76.8	0.0	0.0	38.2
UCLF (%)	89.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/06/07-2010/10/23)

5. Historical Summary

Date of Construction Start: 12 Aug 1972
Date of First Criticality: 14/09/1978
Date of Grid Connection: 10 Nov 1978
Date of Commercial Operation: 12 May 1979

Lifetime Generation: 222011.0 GW(e).h
Cumulative Energy Availability Factor: 72.0%
Cumulative Load Factor: 72.7%
Cumulative Unit Capability Factor: 72.1%
Cumulative Energy Unavailability Factor: 28.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	839.3	1120	100.0	100.0	100.0	100.0	100.7	100.7	744	100.0
1980	5466.4	1120	55.2	58.7	55.2	58.7	55.6	59.1	4976	56.6
1981	5031.7	1120	51.0	55.0	51.0	55.0	51.3	55.4	4668	53.3
1982	8648.6	1120	87.6	65.6	87.6	65.6	88.2	66.0	7877	89.9
1983	7443.8	1120	75.2	67.9	75.2	67.9	75.9	68.4	6670	76.1
1984	5793.5	1120	58.5	66.1	58.5	66.1	58.9	66.5	5208	59.3
1985	6843.0	1120	69.2	66.6	69.2	66.6	69.7	67.1	6260	71.5
1986	9858.9	1120	99.5	71.2	99.5	71.2	100.5	71.8	8760	100.0
1987	6238.1	1120	66.8	70.7	65.3	70.5	63.6	70.8	5789	66.1
1988	6112.3	1120	62.9	69.8	62.9	69.7	62.1	69.8	5525	62.9
1989	9828.0	1120	99.4	72.8	99.4	72.6	100.2	72.8	8707	99.4
1990	6685.7	1120	66.1	72.2	66.1	72.0	68.1	72.4	6069	69.3
1991	6409.5	1120	71.3	72.1	69.4	71.8	65.3	71.8	5903	67.4
1992	6973.3	1120	70.2	71.9	70.2	71.7	70.9	71.7	6178	70.3
1993	8863.9	1120	89.5	73.2	89.5	72.9	90.3	73.1	7903	90.2
1994	6680.0	1120	67.9	72.8	67.9	72.6	68.1	72.7	5929	67.7
1995	3273.5	1120	33.4	70.4	33.3	70.2	33.4	70.3	3060	34.9
1996	9738.2	1120	98.3	72.0	98.0	71.8	99.0	72.0	8662	98.6
1997	5316.5	1120	53.7	71.0	53.7	70.8	54.2	71.0	4753	54.3
1998	6501.3	1120	65.7	70.7	65.6	70.5	66.3	70.7	5760	65.8
1999	4511.1	1120	45.6	69.5	45.6	69.3	46.0	69.5	3994	45.6
2000	7796.8	1120	78.6	69.9	78.6	69.7	79.3	70.0	6987	79.5
2001	7163.5	1120	71.3	70.0	71.3	69.8	73.0	70.1	6302	71.9
2002	8265.6	1120	83.6	70.6	83.6	70.4	84.2	70.7	7326	83.6
2003	10075.6	1120	100.0	71.8	100.0	71.6	102.7	72.0	8760	100.0
2004	8408.3	1120	83.4	72.3	83.4	72.1	85.5	72.6	7324	83.4
2005	6970.4	1120	70.6	72.2	70.6	72.0	71.0	72.5	6139	70.1
2006	7003.7	1120	69.1	72.1	69.1	71.9	71.4	72.5	6085	69.5
2007	7759.9	1120	76.8	72.2	76.8	72.1	79.1	72.7	6768	77.3
2008	10041.5	1120	99.1	73.2	99.1	73.0	102.1	73.7	8784	100.0
2009	5960.7	1120	59.0	72.7	59.0	72.6	60.8	73.3	5201	59.4
2010	5483.8	1120	54.2	72.1	54.2	72.0	55.9	72.7	4803	54.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		638			366	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	3319			1870		
D. Inspection, maintenance or repair without refuelling				14		
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
Z. Others					28	
Subtotal	3319	638	0	1884	401	8
Total		3957			2293	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	638	55
12. Reactor I&C Systems		131
13. Reactor Auxiliary Systems		26
14. Safety Systems		0
15. Reactor Cooling Systems		9
16. Steam generation systems		107
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		11
41. Main Generator Systems		6
42. Electrical Power Supply Systems		9
Total	638	362

JP-50 OHI-3

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1127.0 MW(e)
Design Net Capacity: 1127.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8297.0 GW(e).h
Energy Availability Factor: 82.8%
Load Factor: 84.0%
Operating Factor: 83.3%
Energy Unavailability Factor: 17.2%
Total Off-line Time: 1461 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	201.5	770.8	853.6	778.0	0.0	643.0	850.1	846.2	819.5	852.7	826.8	854.9	8297.0
EAF (%)	23.9	100.0	100.0	94.2	0.0	78.2	100.0	100.0	100.0	100.0	100.0	100.0	82.8
UCF (%)	23.9	100.0	100.0	94.2	0.0	78.2	100.0	100.0	100.0	100.0	100.0	100.0	82.8
LF (%)	24.0	101.8	101.8	95.9	0.0	79.2	101.4	100.9	101.0	101.7	101.9	102.0	84.0
OF (%)	26.9	100.0	100.0	94.7	0.0	81.3	100.0	100.0	100.0	100.0	100.0	100.0	83.3
EUUF (%)	76.1	0.0	0.0	5.8	100.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	17.2
PUF (%)	76.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
UCLF (%)	0.0	0.0	0.0	5.8	100.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	10.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2009/10/31-2010/01/23)

5. Historical Summary

Date of Construction Start: 10 Mar 1987 **Lifetime Generation:** 154061.0 GW(e).h
Date of First Criticality: 17/05/1991 **Cumulative Energy Availability Factor:** 81.1%
Date of Grid Connection: 06 Jul 1991 **Cumulative Load Factor:** 81.9%
Date of Commercial Operation: 18/12/1991 **Cumulative Unit Capability Factor:** 81.1%
Cumulative Energy Unavailability Factor: 18.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1991	843.6	1127	100.0	100.0	100.0	100.0	100.6	100.6	744	100.0
1992	9954.7	1127	100.0	100.0	100.0	100.0	100.6	100.6	8784	100.0
1993	7863.7	1127	79.4	90.1	79.4	90.1	79.7	90.5	7025	80.2
1994	8139.1	1127	82.5	87.7	82.5	87.7	82.4	87.9	7265	82.9
1995	7701.7	1127	77.8	85.3	77.8	85.3	78.0	85.5	6887	78.6
1996	9957.4	1127	100.0	88.2	100.0	88.2	100.6	88.5	8784	100.0
1997	8333.0	1127	83.9	87.5	83.9	87.5	84.4	87.8	7385	84.3
1998	8872.7	1127	89.3	87.7	89.3	87.7	89.9	88.1	7867	89.8
1999	8892.3	1127	89.9	88.0	89.5	87.9	90.1	88.3	7875	89.9
2000	8868.9	1127	89.1	88.1	89.1	88.1	89.6	88.5	7824	89.1
2001	8474.7	1127	85.4	87.8	85.4	87.8	85.8	88.2	7481	85.4
2002	9918.7	1127	100.0	88.9	100.0	88.9	100.5	89.3	8760	100.0
2003	8683.2	1127	85.9	88.7	85.9	88.6	88.0	89.2	7525	85.9
2004	3040.2	1127	30.0	84.2	30.0	84.2	30.7	84.7	2634	30.0
2005	7834.0	1127	77.6	83.7	77.6	83.7	79.4	84.3	6968	79.5
2006	8012.3	1127	79.6	83.5	79.6	83.4	81.2	84.1	7001	79.9
2007	10080.1	1127	100.0	84.5	100.0	84.5	102.1	85.3	8760	100.0
2008	2355.6	1127	23.4	80.9	23.4	80.9	23.8	81.6	2081	23.7
2009	8335.2	1127	83.1	81.0	83.1	81.0	84.4	81.8	7282	83.1
2010	8297.0	1127	82.8	81.1	82.8	81.1	84.0	81.9	7299	83.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure C. Inspection, maintenance or repair combined with refuelling S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)	545	917		1059	601	
Subtotal	545	917	0	1059	601	0
Total		1462			1660	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1993 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		310
13. Reactor Auxiliary Systems		28
15. Reactor Cooling Systems		262
Total	0	600

JP-51 OHI-4

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1127.0 MW(e)
Design Net Capacity: 1127.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6977.3 GW(e).h
Energy Availability Factor: 69.4%
Load Factor: 70.7%
Operating Factor: 69.7%
Energy Unavailability Factor: 30.6%
Total Off-line Time: 2651 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	854.8	173.2	0.0	0.0	55.9	828.5	854.4	849.1	821.4	855.3	828.7	856.0	6977.3
EAF (%)	100.0	22.4	0.0	0.0	6.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.4
UCF (%)	100.0	22.4	0.0	0.0	6.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.4
LF (%)	101.9	22.9	0.0	0.0	6.7	102.1	101.9	101.3	101.2	102.0	102.1	102.1	70.7
OF (%)	100.0	22.9	0.0	0.0	10.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.7
EUf (%)	0.0	77.6	100.0	100.0	93.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6
PUF (%)	0.0	77.6	100.0	100.0	93.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/02/07-2010/05/28)

5. Historical Summary

Date of Construction Start: 13/06/1988 **Lifetime Generation:** 151920.0 GW(e).h
Date of First Criticality: 28/05/1992 **Cumulative Energy Availability Factor:** 84.6%
Date of Grid Connection: 19/06/1992 **Cumulative Load Factor:** 85.8%
Date of Commercial Operation: 02 Feb 1993 **Cumulative Unit Capability Factor:** 84.6%
Cumulative Energy Unavailability Factor: 15.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	9079.7	1127	100.0	100.0	100.0	100.0	100.5	100.5	8016	100.0
1994	7851.5	1127	79.7	89.4	79.7	89.4	79.5	89.6	7063	80.6
1995	7495.1	1127	75.6	84.7	75.6	84.7	75.9	84.9	6695	76.4
1996	7051.1	1127	70.8	81.1	70.8	81.1	71.2	81.4	6221	70.8
1997	7660.2	1127	77.1	80.3	77.1	80.3	77.6	80.6	6756	77.1
1998	8839.4	1127	89.0	81.8	89.0	81.8	89.5	82.1	7835	89.4
1999	8903.4	1127	89.9	82.9	89.5	82.9	90.2	83.3	7872	89.9
2000	8649.8	1127	86.8	83.4	86.8	83.4	87.4	83.8	7629	86.9
2001	9283.6	1127	93.4	84.5	93.4	84.5	94.0	84.9	8179	93.4
2002	9217.1	1127	91.5	85.2	91.5	85.2	93.4	85.8	8017	91.5
2003	8762.6	1127	86.3	85.3	86.3	85.3	88.8	86.1	7557	86.3
2004	8318.2	1127	81.8	85.0	81.8	85.0	84.0	85.9	7186	81.8
2005	9929.0	1127	98.8	86.1	98.8	86.1	100.6	87.0	8657	98.8
2006	8163.9	1127	80.7	85.7	80.7	85.7	82.7	86.7	7087	80.9
2007	7978.6	1127	78.9	85.3	78.9	85.2	80.8	86.3	6934	79.2
2008	7642.7	1127	75.4	84.6	75.4	84.6	77.2	85.8	6654	75.8
2009	10097.4	1127	100.0	85.5	100.0	85.5	102.3	86.7	8760	100.0
2010	6977.3	1127	69.4	84.6	69.4	84.6	70.7	85.8	6109	69.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					191	
C. Inspection, maintenance or repair combined with refuelling	2651			1020		
Z. Others					33	
Subtotal	2651	0	0	1020	224	0
Total	2651			1244		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1994 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
41. Main Generator Systems		188
Total	0	191

JP-22 ONAGAWA-1

Operator: TOHOKU (TOHOKU ELECTRIC POWER CO.,INC)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 498.0 MW(e)
 Design Net Capacity: 496.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2661.1 GW(e).h
 Energy Availability Factor: 60.2%
 Load Factor: 61.0%
 Operating Factor: 60.9%
 Energy Unavailability Factor: 39.8%
 Total Off-line Time: 3422 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	372.0	263.5	0.0	0.0	0.0	0.0	164.1	375.7	363.1	377.1	366.5	379.2	2661.1
EAF (%)	100.0	78.4	0.0	0.0	0.0	0.0	44.2	100.0	100.0	100.0	100.0	100.0	60.2
UCF (%)	100.0	78.4	0.0	0.0	0.0	0.0	44.2	100.0	100.0	100.0	100.0	100.0	60.2
LF (%)	100.4	78.7	0.0	0.0	0.0	0.0	44.3	101.4	101.3	101.8	102.2	102.3	61.0
OF (%)	100.0	78.7	0.0	0.0	0.0	0.0	52.8	100.0	100.0	100.0	100.0	100.0	60.9
EUAF (%)	0.0	21.6	100.0	100.0	100.0	100.0	55.8	0.0	0.0	0.0	0.0	0.0	39.8
PUF (%)	0.0	21.6	100.0	100.0	100.0	100.0	42.5	0.0	0.0	0.0	0.0	0.0	38.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0	0.0	0.0	1.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING (2010/2/23-2010/7/11) EXTENSION OF PERIODICAL INSPECTION (2010/7/12-2010/7/16) OPERATION AT FULL POWER IN BASE LOAD (2010/7/22-)

5. Historical Summary

Date of Construction Start: 07 Aug 1980 Lifetime Generation: 80913.0 GW(e).h
 Date of First Criticality: 18/10/1983 Cumulative Energy Availability Factor: 67.0%
 Date of Grid Connection: 18/11/1983 Cumulative Load Factor: 67.1%
 Date of Commercial Operation: 06 Jan 1984 Cumulative Unit Capability Factor: 68.6%
 Cumulative Energy Unavailability Factor: 33.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	2519.8	496	98.9	98.9	98.9	98.9	98.9	98.9	5136	100.0
1985	3259.2	496	75.6	84.2	75.6	84.2	75.0	83.8	6681	76.3
1986	3366.6	496	77.9	81.8	77.9	81.8	77.5	81.4	6871	78.4
1987	3161.7	497	72.8	79.3	72.8	79.3	72.6	78.9	6500	74.2
1988	3410.6	496	78.6	79.1	78.6	79.1	78.3	78.8	6949	79.1
1989	3013.7	497	69.1	77.3	69.1	77.3	69.2	77.1	6177	70.5
1990	2850.7	497	65.6	75.5	65.6	75.5	65.5	75.3	5908	67.4
1991	3345.9	497	77.0	75.7	77.0	75.7	76.9	75.5	6954	79.4
1992	4120.5	497	94.7	78.0	94.7	77.9	94.4	77.7	8342	95.0
1993	2300.1	497	52.0	75.2	50.6	75.1	52.8	75.1	4666	53.3
1994	3428.8	497	78.7	75.6	78.6	75.4	78.8	75.5	6961	79.5
1995	2936.4	497	68.2	74.9	67.8	74.8	67.4	74.8	6000	68.5
1996	3727.2	498	85.6	75.8	85.6	75.6	85.2	75.6	7523	85.6
1997	3304.6	498	76.2	75.8	76.2	75.7	75.8	75.6	6708	76.6
1998	3359.5	498	76.9	75.9	76.9	75.8	77.0	75.7	6841	78.1
1999	4240.2	498	97.2	77.3	97.2	77.1	97.2	77.1	8517	97.2
2000	3689.1	498	84.6	77.7	84.6	77.6	84.3	77.5	7436	84.7
2001	3425.1	498	78.5	77.8	78.4	77.6	78.5	77.6	6873	78.5
2002	3143.2	498	68.5	77.3	68.5	77.1	72.1	77.3	6001	68.5
2003	1856.1	498	42.5	75.5	42.5	75.4	42.5	75.5	3725	42.5
2004	2998.9	498	68.6	75.1	68.5	75.0	68.6	75.2	6020	68.5
2005	1898.6	498	80.8	75.4	43.1	73.6	43.5	73.7	3799	43.4
2006	0.0	498	4.8	72.3	0.0	70.3	0.0	70.4	0	0.0
2007	2162.2	498	49.3	71.3	49.3	69.4	49.6	69.6	4351	49.7
2008	530.8	498	12.0	68.9	12.0	67.1	12.1	67.2	1057	12.0
2009	3117.3	498	71.3	69.0	71.3	67.2	71.5	67.4	6531	74.6
2010	2661.1	498	60.2	68.6	60.2	67.0	61.0	67.1	5338	60.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					382	
C. Inspection, maintenance or repair combined with refuelling	3335			1542	82	
D. Inspection, maintenance or repair without refuelling				244		
E. Testing of plant systems or components					374	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
L. Human factor related		102				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						142
Subtotal	3335	102	0	1786	838	146
Total		3437			2770	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
14. Safety Systems		93
15. Reactor Cooling Systems		187
31. Turbine and auxiliaries		28
32. Feedwater and Main Steam System		56
41. Main Generator Systems		11
42. Electrical Power Supply Systems		5
Total	0	380

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					587	
C. Inspection, maintenance or repair combined with refuelling	1343			1241	5	
D. Inspection, maintenance or repair without refuelling				38		
E. Testing of plant systems or components					11	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						224
Subtotal	1343	0	0	1279	603	224
Total		1343			2106	

7. Equipment Related Full Outages, Analysis by System

System	2010	1995 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		49
12. Reactor I&C Systems		115
13. Reactor Auxiliary Systems		99
15. Reactor Cooling Systems		253
31. Turbine and auxiliaries		21
32. Feedwater and Main Steam System		47
Total	0	584

JP-57 ONAGAWA-3

Operator: TOHOKU (TOHOKU ELECTRIC POWER CO.,INC)
 Contractor: TOSHIBA (TOSHIBA CORPORATION)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 796.0 MW(e)
 Design Net Capacity: 796.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5342.8 GW(e).h
 Energy Availability Factor: 74.2%
 Load Factor: 76.6%
 Operating Factor: 74.7%
 Energy Unavailability Factor: 25.8%
 Total Off-line Time: 2220 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	610.7	551.0	611.3	592.4	611.4	591.2	547.0	0.0	0.0	29.0	591.4	607.4	5342.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	89.8	0.0	0.0	5.0	100.0	98.5	74.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	89.8	0.0	0.0	5.0	100.0	98.5	74.2
LF (%)	103.1	103.0	103.2	103.4	103.2	103.2	92.4	0.0	0.0	4.9	103.2	102.6	76.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	90.5	0.0	0.0	7.9	100.0	100.0	74.7
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	10.2	100.0	100.0	95.0	0.0	1.5	25.8
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	10.2	100.0	100.0	95.0	0.0	0.0	25.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE LOAD (-2010/7/28) PERIODICAL INSPECTION AND REFUELING
 (2010/7/29-2010/10-29) INVESTIGATION OF INCREASE RADIATION LEVEL OF GASEOUS WASTE TREATMENT
 SYSTEM (SURVEY FOR FUEL FAILURE) (2010/12/31-)

5. Historical Summary

Date of Construction Start: 23/01/1998
 Date of First Criticality: 26/04/2001
 Date of Grid Connection: 30/05/2001
 Date of Commercial Operation: 30/01/2002

Lifetime Generation: 42425.0 GW(e).h
 Cumulative Energy Availability Factor: 66.9%
 Cumulative Load Factor: 68.0%
 Cumulative Unit Capability Factor: 68.3%
 Cumulative Energy Unavailability Factor: 33.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	6652.5	796	100.0	100.0	100.0	100.0	95.4	95.4	8064	92.1
2003	5978.2	796	84.7	92.3	83.7	91.9	85.7	90.6	7332	83.7
2004	5348.7	796	74.6	86.4	74.4	86.0	76.5	85.9	6548	74.5
2005	4381.8	796	72.7	83.0	61.2	79.8	62.8	80.1	5460	62.3
2006	2798.1	796	39.0	74.2	39.0	71.7	40.1	72.1	3476	39.7
2007	2261.4	796	31.7	67.1	31.7	65.0	32.4	65.5	2887	33.0
2008	6502.2	796	90.1	70.4	90.1	68.6	93.0	69.4	7921	90.2
2009	3405.8	796	47.5	67.5	47.5	66.0	48.8	66.9	4202	48.0
2010	5342.8	796	74.2	68.3	74.2	66.9	76.6	68.0	6540	74.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					276	
C. Inspection, maintenance or repair combined with refuelling	2230			1397	244	
D. Inspection, maintenance or repair without refuelling					424	
E. Testing of plant systems or components					128	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						136
Z. Others					348	
Subtotal	2230	0	0	1397	1420	136
Total		2230			2953	

7. Equipment Related Full Outages, Analysis by System

System	2010	2003 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		70
31. Turbine and auxiliaries		55
32. Feedwater and Main Steam System		149
Total	0	274

JP-28 SENDAI-1

Operator: KYUSHU (KYUSHU ELECTRIC POWER CO.,INC.)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 846.0 MW(e)
Design Net Capacity: 846.0 MW(e)
Design Discharge Burnup: 49000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4919.6 GW(e).h
Energy Availability Factor: 62.7%
Load Factor: 66.4%
Operating Factor: 63.6%
Energy Unavailability Factor: 37.3%
Total Off-line Time: 3189 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	63.3	0.0	0.0	0.0	247.2	651.0	664.7	657.1	638.5	667.1	652.6	678.0	4919.6
EAF (%)	9.4	0.0	0.0	0.0	38.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	62.7
UCF (%)	9.4	0.0	0.0	0.0	38.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	62.7
LF (%)	10.1	0.0	0.0	0.0	39.3	106.9	105.6	104.4	104.8	106.0	107.1	107.7	66.4
OF (%)	9.8	0.0	0.0	0.0	48.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	63.6
EUf (%)	90.6	100.0	100.0	100.0	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.3
PUf (%)	90.6	100.0	100.0	100.0	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NONE

5. Historical Summary

Date of Construction Start: 15/12/1979
Date of First Criticality: 25/08/1983
Date of Grid Connection: 16/09/1983
Date of Commercial Operation: 07 Apr 1984

Lifetime Generation: 169937.0 GW(e).h
Cumulative Energy Availability Factor: 81.8%
Cumulative Load Factor: 83.4%
Cumulative Unit Capability Factor: 81.8%
Cumulative Energy Unavailability Factor: 18.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	3775.4	846	100.0	100.0	100.0	100.0	101.1	101.1	4416	100.0
1985	5890.3	846	78.7	85.8	78.7	85.8	79.5	86.7	6964	79.5
1986	6084.0	846	81.4	84.0	81.4	84.0	82.1	84.9	7224	82.5
1987	6113.4	846	81.7	83.4	81.7	83.4	82.5	84.2	7261	82.9
1988	5683.1	846	75.8	81.7	75.8	81.7	76.5	82.5	6756	76.9
1989	7381.3	846	98.7	84.8	98.7	84.8	99.6	85.6	8641	98.6
1990	6155.0	846	82.3	84.4	82.3	84.4	83.1	85.2	7307	83.4
1991	5590.7	846	74.8	83.1	74.8	83.1	75.4	83.9	6684	76.3
1992	5713.9	846	76.1	82.3	76.1	82.3	76.9	83.1	6780	77.2
1993	6619.2	846	88.4	82.9	88.4	82.9	89.3	83.7	7753	88.5
1994	5778.3	846	77.2	82.4	77.2	82.4	78.0	83.2	6762	77.2
1995	5780.3	846	77.3	81.9	77.3	81.9	78.0	82.7	6863	78.3
1996	5185.4	846	69.1	80.9	69.1	80.9	69.8	81.7	6157	70.1
1997	7216.7	846	96.4	82.1	96.4	82.1	97.4	82.9	8449	96.4
1998	5291.2	846	70.6	81.3	70.6	81.3	71.4	82.1	6311	72.0
1999	6057.6	846	80.8	81.2	80.8	81.2	81.7	82.0	7082	80.8
2000	5654.0	846	75.2	80.9	75.2	80.9	76.1	81.7	6609	75.2
2001	7367.0	846	98.3	81.9	98.3	81.9	99.4	82.7	8614	98.3
2002	6323.0	846	83.7	82.0	83.7	82.0	85.3	82.8	7333	83.7
2003	6282.1	846	83.1	82.0	83.1	82.0	84.8	82.9	7278	83.1
2004	6080.8	846	80.1	81.9	80.1	81.9	81.8	82.9	7043	80.2
2005	7155.8	846	94.7	82.5	94.7	82.5	96.6	83.5	8305	94.8
2006	6436.6	846	82.9	82.5	82.9	82.5	86.9	83.7	7330	83.7
2007	5868.9	846	75.2	82.2	75.2	82.2	79.2	83.5	6660	76.0
2008	5665.1	846	71.9	81.8	71.9	81.8	76.2	83.2	6396	72.8
2009	7880.1	846	100.0	82.5	100.0	82.5	106.3	84.1	8760	100.0
2010	4919.6	846	62.7	81.8	62.7	81.8	66.4	83.4	5571	63.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure C. Inspection, maintenance or repair combined with refuelling	3201			1408	71	
Subtotal	3201	0	0	1408	71	0
Total	3201			1479		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		1
13. Reactor Auxiliary Systems		10
16. Steam generation systems		25
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		24
Total	0	68

JP-37 SENDAI-2

Operator: KYUSHU (KYUSHU ELECTRIC POWER CO.,INC.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 846.0 MW(e)
 Design Net Capacity: 846.0 MW(e)
 Design Discharge Burnup: 49000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5767.5 GW(e).h
 Energy Availability Factor: 74.8%
 Load Factor: 77.8%
 Operating Factor: 75.7%
 Energy Unavailability Factor: 25.2%
 Total Off-line Time: 2130 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	647.3	584.6	647.1	227.3	0.0	0.0	395.7	652.6	633.9	662.2	646.3	670.5	5767.5
EAF (%)	100.0	100.0	100.0	36.4	0.0	0.0	61.4	100.0	100.0	100.0	100.0	100.0	74.8
UCF (%)	100.0	100.0	100.0	36.4	0.0	0.0	61.4	100.0	100.0	100.0	100.0	100.0	74.8
LF (%)	102.8	102.8	102.8	37.3	0.0	0.0	62.9	103.7	104.1	105.2	106.1	106.5	77.8
OF (%)	100.0	100.0	100.0	36.8	0.0	0.0	71.6	100.0	100.0	100.0	100.0	100.0	75.7
EUF (%)	0.0	0.0	0.0	63.6	100.0	100.0	38.6	0.0	0.0	0.0	0.0	0.0	25.2
PUF (%)	0.0	0.0	0.0	63.6	100.0	100.0	38.6	0.0	0.0	0.0	0.0	0.0	25.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NONE

5. Historical Summary

Date of Construction Start: 10 Dec 1981 Lifetime Generation: 155954.0 GW(e).h
 Date of First Criticality: 18/03/1985 Cumulative Energy Availability Factor: 83.3%
 Date of Grid Connection: 04 May 1985 Cumulative Load Factor: 84.6%
 Date of Commercial Operation: 28/11/1985 Cumulative Unit Capability Factor: 83.3%
 Cumulative Energy Unavailability Factor: 16.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	1252.9	846	100.0	100.0	100.0	100.0	101.2	101.2	1464	100.0
1986	5996.4	846	80.1	83.0	80.1	83.0	80.9	83.8	7112	81.2
1987	6080.6	846	81.2	82.2	81.2	82.2	82.0	83.0	7211	82.3
1988	7409.8	846	98.7	87.4	98.7	87.4	99.7	88.3	8665	98.6
1989	4999.4	846	66.8	82.5	66.8	82.5	67.5	83.3	5950	67.9
1990	6160.1	846	82.4	82.4	82.4	82.4	83.1	83.3	7309	83.4
1991	5665.3	846	75.7	81.4	75.7	81.4	76.4	82.2	6732	76.8
1992	7385.3	846	98.3	83.7	98.3	83.7	99.4	84.6	8639	98.3
1993	5822.0	846	77.7	83.0	77.7	83.0	78.6	83.8	6632	75.7
1994	5568.8	846	74.3	82.0	74.3	82.0	75.1	82.9	6557	74.9
1995	5658.4	846	75.5	81.4	75.5	81.4	76.4	82.2	6709	76.6
1996	7359.3	846	98.0	82.9	98.0	82.9	99.0	83.7	8617	98.1
1997	5950.3	846	79.4	82.6	79.4	82.6	80.3	83.5	7034	80.3
1998	5899.1	846	78.7	82.3	78.7	82.3	79.6	83.2	6973	79.6
1999	5658.3	846	75.5	81.8	75.5	81.8	76.4	82.7	6612	75.5
2000	7370.2	846	98.0	82.9	98.0	82.9	99.2	83.8	8614	98.1
2001	6210.2	846	82.9	82.9	82.9	82.9	83.8	83.8	7260	82.9
2002	6255.5	846	82.8	82.9	82.8	82.9	84.4	83.8	7257	82.8
2003	6348.8	846	83.4	82.9	83.4	82.9	85.7	83.9	7315	83.5
2004	6762.5	846	88.5	83.2	88.5	83.2	91.0	84.3	7774	88.5
2005	6752.8	846	88.9	83.5	88.9	83.5	91.1	84.6	7895	90.1
2006	6464.2	846	85.3	83.6	85.3	83.6	87.2	84.7	7548	86.2
2007	5989.3	846	79.0	83.4	79.0	83.4	80.8	84.6	6996	79.9
2008	6824.3	846	89.9	83.7	89.9	83.7	91.8	84.9	7897	89.9
2009	6320.2	846	83.2	83.6	83.2	83.6	85.3	84.9	7355	84.0
2010	5767.5	846	74.8	83.3	74.8	83.3	77.8	84.6	6630	75.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure C. Inspection, maintenance or repair combined with refuelling	2130			1377	4	
Subtotal	2130	0	0	1377	4	0
Total	2130			1381		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
32. Feedwater and Main Steam System		4
Total	0	4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		559			107	
C. Inspection, maintenance or repair combined with refuelling	1902			1660		
D. Inspection, maintenance or repair without refuelling				516		
E. Testing of plant systems or components				121		
H. Nuclear regulatory requirements		30			38	
J. Grid limitation, failure or grid unavailability						35
Subtotal	1902	589	0	2297	145	35
Total		2491			2477	

7. Equipment Related Full Outages, Analysis by System

System	2010	1994 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	266	
15. Reactor Cooling Systems	293	55
31. Turbine and auxiliaries		9
41. Main Generator Systems		24
42. Electrical Power Supply Systems		17
Total	559	105

JP-59 SHIKA-2

Operator: HOKURIKU (HOKURIKU ELECTRIC POWER CO.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1108.0 MW(e)
 Design Net Capacity: 1304.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9279.2 GW(e).h
 Energy Availability Factor: 91.5%
 Load Factor: 95.6%
 Operating Factor: 91.8%
 Energy Unavailability Factor: 8.5%
 Total Off-line Time: 722 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	-3.1	769.2	863.2	835.9	863.5	834.6	861.5	861.8	834.3	862.3	834.1	861.8	9279.2
EAF (%)	1.1	98.8	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0	99.9	100.0	91.5
UCF (%)	1.1	98.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	100.0	91.5
LF (%)	-0.4	103.3	104.7	104.8	104.8	104.6	104.5	104.5	104.6	104.6	104.6	104.5	95.6
OF (%)	3.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.8
EUUF (%)	98.9	1.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	8.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	98.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

INSPECTION OF EMERGENCY DIESEL GENERATOR

5. Historical Summary

Date of Construction Start: 20/08/2001
 Date of First Criticality: 26/05/2005
 Date of Grid Connection: 07 Apr 2005
 Date of Commercial Operation: 15/03/2006
 Lifetime Generation: 27888.0 GW(e).h
 Cumulative Energy Availability Factor: 47.9%
 Cumulative Load Factor: 49.7%
 Cumulative Unit Capability Factor: 47.9%
 Cumulative Energy Unavailability Factor: 52.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2006	3953.9	1304	41.1	41.1	41.1	41.1	41.3	41.3	3030	41.3
2007	0.0	1304	0.0	18.8	0.0	18.8	0.0	18.8	0	0.0
2008	6381.9	1108	58.5	32.0	58.5	32.0	61.1	32.9	5610	63.9
2009	5647.1	1108	55.9	37.6	55.9	37.6	58.2	38.8	5044	57.6
2010	9279.2	1108	91.5	47.9	91.5	47.9	95.6	49.7	8038	91.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		722			422	
C. Inspection, maintenance or repair combined with refuelling				947		
E. Testing of plant systems or components				181		
H. Nuclear regulatory requirements					2614	
L. Human factor related					5	
Subtotal	0	722	0	1128	3041	0
Total		722			4169	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
31. Turbine and auxiliaries		188
42. Electrical Power Supply Systems	722	233
Total	722	421

JP-7 SHIMANE-1

Operator: CHUGOKU (THE CHUGOKU ELECTRIC POWER CO.,INC.)
 Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 439.0 MW(e)
 Design Net Capacity: 439.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 969.9 GW(e).h
 Energy Availability Factor: 24.5%
 Load Factor: 25.2%
 Operating Factor: 24.6%
 Energy Unavailability Factor: 75.5%
 Total Off-line Time: 6609 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	335.8	303.6	330.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	969.9
EAF (%)	100.0	100.0	98.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5
UCF (%)	100.0	100.0	98.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.5
LF (%)	102.8	102.9	101.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.2
OF (%)	100.0	100.0	98.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6
EUF (%)	0.0	0.0	1.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8
UCLF (%)	0.0	0.0	1.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	23.3	0.0	60.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNSCHEDULED SHUTDOWN DUE TO DEFICIENT INSPECTIONS.

5. Historical Summary

Date of Construction Start: 07 Feb 1970
 Date of First Criticality: 06 Jan 1973
 Date of Grid Connection: 12 Feb 1973
 Date of Commercial Operation: 29/03/1974
 Lifetime Generation: 101877.0 GW(e).h
 Cumulative Energy Availability Factor: 71.4%
 Cumulative Load Factor: 71.6%
 Cumulative Unit Capability Factor: 71.6%
 Cumulative Energy Unavailability Factor: 28.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	2756.2	440	84.0	84.0	84.0	84.0	85.3	85.3	6387	87.0
1975	2946.1	439	78.7	81.1	78.7	81.1	76.6	80.6	7010	80.0
1976	2802.9	439	72.7	78.2	72.7	78.2	72.7	77.8	6697	76.2
1977	1879.1	439	48.9	70.6	48.9	70.6	48.9	70.3	4489	51.2
1978	2701.8	439	70.3	70.5	70.3	70.5	70.3	70.3	6394	73.0
1979	2623.6	439	68.4	70.1	68.4	70.1	68.2	69.9	6341	72.4
1980	2734.6	439	70.9	70.2	70.9	70.2	70.9	70.1	6466	73.6
1981	2293.1	439	57.0	68.5	57.0	68.5	59.6	68.7	5430	62.0
1982	2366.8	439	61.5	67.7	61.5	67.7	61.5	67.9	5499	62.8
1983	2696.1	439	70.1	68.0	70.1	68.0	70.1	68.1	6268	71.6
1984	2990.7	439	78.2	68.9	78.2	68.9	77.6	69.0	6912	78.7
1985	3790.4	439	100.0	71.6	99.1	71.5	98.6	71.5	8705	99.4
1986	2130.5	439	55.5	70.3	55.5	70.2	55.4	70.3	4903	56.0
1987	3011.2	439	79.4	71.0	78.6	70.8	78.3	70.8	6937	79.2
1988	2355.1	439	61.1	70.3	61.1	70.2	61.1	70.2	5398	61.5
1989	2616.3	439	68.1	70.2	68.1	70.0	68.0	70.0	5965	68.1
1990	3745.5	439	97.4	71.8	97.4	71.7	97.4	71.7	8565	97.8
1991	3111.3	439	80.9	72.3	80.9	72.2	80.9	72.2	7123	81.3
1992	2671.3	439	73.4	72.3	69.4	72.0	69.3	72.0	6134	69.8
1993	2549.1	439	66.5	72.0	66.5	71.7	66.3	71.7	5849	66.8
1994	2948.0	439	76.7	72.3	76.7	72.0	76.7	72.0	6733	76.9
1995	2984.6	439	78.1	72.5	78.1	72.3	77.6	72.2	6862	78.3
1996	2245.5	439	58.4	71.9	58.4	71.7	58.2	71.6	5154	58.7
1997	2923.6	439	76.2	72.1	76.2	71.8	76.0	71.8	6712	76.6
1998	3845.4	439	100.0	73.2	100.0	73.0	100.0	72.9	8760	100.0
1999	3359.3	439	87.4	73.8	87.4	73.5	87.4	73.5	7657	87.4
2000	1381.2	439	35.8	72.3	35.8	72.1	35.8	72.1	3149	35.8
2001	2844.6	439	74.1	72.4	74.1	72.2	74.0	72.2	6488	74.1
2002	3393.2	439	88.2	73.0	88.2	72.8	88.2	72.7	7730	88.2
2003	2749.0	439	71.4	72.9	71.4	72.7	71.5	72.7	6253	71.4
2004	3937.9	439	100.0	73.8	100.0	73.6	102.1	73.6	8784	100.0
2005	2382.3	439	60.8	73.4	60.8	73.2	61.9	73.3	5349	61.1
2006	2699.5	439	68.7	73.2	68.7	73.1	70.2	73.2	6025	68.8
2007	2866.6	439	73.4	73.2	73.4	73.1	74.5	73.2	6441	73.5
2008	2738.4	439	69.7	73.1	69.7	73.0	71.0	73.1	6142	69.9
2009	2533.2	439	64.4	72.9	64.4	72.7	65.9	72.9	5667	64.7
2010	969.9	439	24.5	71.6	24.5	71.4	25.2	71.6	2151	24.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					106	
C. Inspection, maintenance or repair combined with refuelling	1296			2043		
D. Inspection, maintenance or repair without refuelling				66		
H. Nuclear regulatory requirements		5318				
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	
Z. Others					10	
Subtotal	1296	5318	0	2109	125	3
Total		6614			2237	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
14. Safety Systems		3
15. Reactor Cooling Systems		68
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		33
Total	0	105

JP-41 SHIMANE-2

Operator: CHUGOKU (THE CHUGOKU ELECTRIC POWER CO.,INC.)
Contractor: HITACHI (HITACHI LTD.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 789.0 MW(e)
Design Net Capacity: 789.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1924.4 GW(e).h
Energy Availability Factor: 27.6%
Load Factor: 27.8%
Operating Factor: 27.8%
Energy Unavailability Factor: 72.4%
Total Off-line Time: 6322 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	593.3	534.6	322.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	474.3	1924.4
EAF (%)	100.0	99.8	54.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.4	27.6
UCF (%)	100.0	99.8	54.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.4	27.6
LF (%)	101.1	100.8	54.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.8	27.8
OF (%)	100.0	100.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	82.4	27.8
EUf (%)	0.0	0.2	45.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	19.6	72.4
PUF (%)	0.0	0.2	45.5	100.0	100.0	100.0	48.3	0.0	0.0	0.0	0.0	1.9	33.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	51.7	100.0	100.0	100.0	100.0	17.6	39.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

EXTENDED PERIODICAL INSPECTION AND REFUELING. DUE TO DEFICIENT INSPECTIONS.

5. Historical Summary

Date of Construction Start: 02 Feb 1985 **Lifetime Generation:** 121764.0 GW(e).h
Date of First Criticality: 25/05/1988 **Cumulative Energy Availability Factor:** 79.3%
Date of Grid Connection: 07 Nov 1988 **Cumulative Load Factor:** 79.2%
Date of Commercial Operation: 02 Oct 1989 **Cumulative Unit Capability Factor:** 79.4%
Cumulative Energy Unavailability Factor: 20.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	5628.8	790	89.2	89.2	89.2	89.2	88.8	88.8	7179	89.6
1990	5123.5	790	74.0	81.3	74.0	81.3	74.0	81.1	6592	75.3
1991	5544.5	790	80.1	80.9	80.1	80.9	80.1	80.8	7121	81.3
1992	5516.1	790	79.7	80.6	79.7	80.6	79.5	80.4	7072	80.5
1993	6756.9	790	97.8	84.1	97.8	84.1	97.6	83.9	8592	98.1
1994	5547.3	790	80.6	83.5	80.6	83.5	80.2	83.3	7071	80.7
1995	5363.6	790	77.9	82.7	77.9	82.7	77.5	82.5	6888	78.6
1996	5583.7	790	80.8	82.4	80.8	82.4	80.5	82.2	7166	81.6
1997	6903.2	789	100.0	84.4	100.0	84.4	99.9	84.2	8760	100.0
1998	5962.5	789	86.5	84.6	86.5	84.6	86.3	84.4	7600	86.8
1999	5758.7	789	83.5	84.5	83.5	84.5	83.3	84.3	7319	83.6
2000	6084.0	789	88.2	84.8	88.1	84.8	87.8	84.6	7747	88.2
2001	6901.0	789	100.0	86.0	100.0	86.0	99.8	85.8	8760	100.0
2002	6055.1	789	87.6	86.1	87.6	86.1	87.6	85.9	7678	87.6
2003	4836.2	789	70.1	85.0	70.0	85.0	70.0	84.8	6133	70.0
2004	4097.6	789	59.0	83.4	59.0	83.4	59.1	83.2	5202	59.2
2005	5907.5	789	85.6	83.5	85.4	83.5	85.5	83.3	7544	86.1
2006	5085.4	789	73.6	83.0	73.6	82.9	73.6	82.8	6469	73.8
2007	5462.0	789	79.5	82.8	79.5	82.8	79.0	82.6	6970	79.6
2008	4703.6	789	68.3	82.1	68.3	82.0	67.9	81.9	6001	68.3
2009	5373.8	789	77.5	81.8	77.5	81.8	77.8	81.7	6799	77.6
2010	1924.4	789	27.6	79.4	27.6	79.3	27.8	79.2	2438	27.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					137	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	2879			1312	6	
D. Inspection, maintenance or repair without refuelling				5		
H. Nuclear regulatory requirements		3443			1	
Z. Others					27	
Subtotal	2879	3443	0	1317	176	0
Total		6322			1493	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		16
15. Reactor Cooling Systems		72
Total	0	97

JP-8 TAKAHAMA-1

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
Contractor: WH/MHI (WESTINGHOUSE ELECTRIC CORPORATION / MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 780.0 MW(e)
Design Net Capacity: 780.0 MW(e)
Design Discharge Burnup: 43000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7193.5 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 105.3%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	614.1	554.9	614.4	594.8	614.0	591.5	605.5	599.9	582.4	610.0	595.6	616.3	7193.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	105.8	105.9	105.9	105.9	105.8	105.3	104.3	103.4	103.7	105.1	106.0	106.2	105.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NO REFUELING, NO OUTAGE.

5. Historical Summary

Date of Construction Start: 25/04/1970
Date of First Criticality: 14/03/1974
Date of Grid Connection: 27/03/1974
Date of Commercial Operation: 14/11/1974

Lifetime Generation: 174130.0 GW(e).h
Cumulative Energy Availability Factor: 69.5%
Cumulative Load Factor: 70.5%
Cumulative Unit Capability Factor: 69.5%
Cumulative Energy Unavailability Factor: 30.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1059.8	780	94.0	94.0	94.0	94.0	92.8	92.8	1376	94.0
1975	4980.4	780	72.8	72.8	72.8	75.9	72.9	75.7	6938	79.2
1976	3170.1	780	46.2	62.1	46.2	62.1	46.3	62.1	4900	55.8
1977	383.8	780	5.6	44.3	5.6	44.3	5.6	44.3	569	6.5
1978	2762.5	780	40.4	43.4	40.4	43.4	40.4	43.4	4088	46.7
1979	1648.9	780	24.1	39.7	24.1	39.7	24.1	39.6	2269	25.9
1980	2705.1	780	39.4	39.6	39.4	39.6	39.5	39.6	3604	41.0
1981	3990.2	780	58.3	42.2	58.3	42.2	58.4	42.2	5180	59.1
1982	3872.1	780	56.5	44.0	56.5	44.0	56.7	44.0	5085	58.0
1983	5716.2	780	83.7	48.3	83.7	48.3	83.7	48.3	7403	84.5
1984	3537.4	780	51.4	48.6	51.4	48.6	51.6	48.7	4586	52.2
1985	5000.8	780	72.8	50.8	72.8	50.8	73.2	50.8	6473	73.9
1986	5070.3	780	73.9	52.7	73.9	52.7	74.2	52.8	6507	74.3
1987	4701.4	780	70.2	54.0	70.2	54.0	68.8	54.0	6148	70.2
1988	4147.1	780	60.9	54.5	60.9	54.5	60.5	54.4	5351	60.9
1989	4877.3	780	72.0	55.6	72.0	55.6	71.4	55.6	6311	72.0
1990	6265.5	780	90.8	57.8	90.8	57.8	91.7	57.8	8002	91.3
1991	4795.0	780	68.2	58.4	68.2	58.4	70.2	58.5	6202	70.8
1992	4645.0	780	67.6	58.9	67.6	58.9	67.8	59.0	6051	68.9
1993	3299.7	780	48.4	58.4	48.4	58.4	48.3	58.5	4458	50.9
1994	4024.0	780	58.8	58.4	58.8	58.4	58.9	58.5	5146	58.7
1995	6585.1	780	96.0	60.2	96.0	60.2	96.4	60.3	8485	96.9
1996	3358.8	780	48.8	59.7	48.8	59.7	49.0	59.8	4331	49.3
1997	4674.4	780	68.1	60.0	68.1	60.0	68.4	60.1	6000	68.5
1998	6856.8	780	100.0	61.7	100.0	61.7	100.4	61.8	8760	100.0
1999	5704.2	780	84.3	62.6	83.2	62.5	83.5	62.7	7291	83.2
2000	6008.1	780	87.4	63.5	87.4	63.5	87.7	63.6	7716	87.8
2001	6005.8	780	87.6	64.4	87.6	64.4	87.9	64.5	7731	88.3
2002	6056.3	780	88.4	65.3	88.4	65.2	88.6	65.4	7749	88.5
2003	6247.2	780	87.2	66.0	87.2	66.0	91.4	66.3	7637	87.2
2004	5539.9	780	77.2	66.4	77.2	66.4	80.9	66.8	6785	77.2
2005	6222.5	780	87.1	67.1	87.1	67.0	91.1	67.5	7659	87.4
2006	6347.1	780	89.2	67.7	89.2	67.7	92.9	68.3	7811	89.2
2007	6012.9	780	84.2	68.2	84.2	68.2	88.0	68.9	7399	84.5
2008	4935.8	780	68.8	68.3	68.8	68.2	72.0	69.0	6077	69.2
2009	5870.1	780	81.7	68.6	81.7	68.6	85.9	69.5	7193	82.1
2010	7193.5	780	100.0	69.5	100.0	69.5	105.3	70.5	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					371	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				1948		
D. Inspection, maintenance or repair without refuelling				192		
E. Testing of plant systems or components				0		
J. Grid limitation, failure or grid unavailability						2
Z. Others					9	
Subtotal	0	0	0	2140	381	2
Total		0			2523	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems		6
15. Reactor Cooling Systems		95
16. Steam generation systems		221
31. Turbine and auxiliaries		15
32. Feedwater and Main Steam System		24
42. Electrical Power Supply Systems		0
Total	0	368

JP-13 TAKAHAMA-2

Operator: KEPCO (KANSAI ELECTRIC POWER CO.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 780.0 MW(e)
 Design Net Capacity: 780.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4935.2 GW(e).h
 Energy Availability Factor: 68.3%
 Load Factor: 72.2%
 Operating Factor: 68.7%
 Energy Unavailability Factor: 31.7%
 Total Off-line Time: 2743 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	615.3	555.8	615.4	595.5	600.5	163.4	0.0	0.0	0.0	574.9	596.8	617.6	4935.2
EAF (%)	100.0	100.0	100.0	100.0	99.4	27.5	0.0	0.0	0.0	94.2	100.0	100.0	68.3
UCF (%)	100.0	100.0	100.0	100.0	99.4	27.5	0.0	0.0	0.0	94.2	100.0	100.0	68.3
LF (%)	106.0	106.0	106.0	106.0	103.5	29.1	0.0	0.0	0.0	99.1	106.3	106.4	72.2
OF (%)	100.0	100.0	100.0	100.0	100.0	28.1	0.0	0.0	0.0	97.7	100.0	100.0	68.7
EUf (%)	0.0	0.0	0.0	0.0	0.6	72.5	100.0	100.0	100.0	5.8	0.0	0.0	31.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	72.5	100.0	100.0	100.0	5.8	0.0	0.0	31.7
UCLF (%)	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PERIODICAL INSPECTION AND REFUELING(2010/06/09-2010/10/01)

5. Historical Summary

Date of Construction Start: 03 Sep 1971 Lifetime Generation: 166156.0 GW(e).h
 Date of First Criticality: 20/12/1974 Cumulative Energy Availability Factor: 67.9%
 Date of Grid Connection: 17/01/1975 Cumulative Load Factor: 69.2%
 Date of Commercial Operation: 14/11/1975 Cumulative Unit Capability Factor: 68.0%
 Cumulative Energy Unavailability Factor: 32.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	1147.0	780	99.5	99.5	99.5	99.5	100.4	100.4	1464	100.0
1976	3728.8	780	54.2	60.7	54.2	60.7	54.4	61.0	6214	70.7
1977	4742.0	780	69.4	64.7	69.4	64.7	69.4	64.9	6429	73.4
1978	4170.3	780	61.0	63.5	61.0	63.5	61.0	63.7	5751	65.7
1979	1281.0	780	18.7	52.8	18.7	52.8	18.7	52.9	1826	20.8
1980	5751.1	780	83.7	58.8	83.7	58.8	83.9	58.9	7450	84.8
1981	4763.2	780	69.6	60.5	69.6	60.5	69.7	60.7	6198	70.8
1982	4133.9	780	60.3	60.5	60.3	60.5	60.5	60.6	5407	61.7
1983	3549.4	780	51.7	59.4	51.7	59.4	51.9	59.6	4645	53.0
1984	4503.1	780	65.4	60.1	65.4	60.1	65.7	60.2	5746	65.4
1985	4967.4	780	72.4	61.3	72.4	61.3	72.7	61.5	6466	73.8
1986	3997.8	780	58.4	61.0	58.4	61.0	58.5	61.2	5183	59.2
1987	4621.8	780	70.3	61.8	67.3	61.5	67.6	61.7	6154	70.3
1988	3071.3	780	45.5	60.5	45.5	60.3	44.8	60.4	4001	45.5
1989	3991.5	780	59.5	60.5	59.5	60.3	58.4	60.3	5213	59.5
1990	1727.9	780	20.8	57.9	20.8	57.7	25.3	58.0	2218	25.3
1991	2265.8	780	32.2	56.3	32.2	56.1	33.2	56.5	3054	34.9
1992	4873.8	780	70.8	57.1	70.8	57.0	71.1	57.3	6226	70.9
1993	5757.0	780	84.0	58.6	84.0	58.4	84.3	58.8	7426	84.8
1994	3357.3	780	49.3	58.1	49.3	58.0	49.1	58.3	4299	49.1
1995	4458.7	780	65.1	58.5	65.1	58.3	65.3	58.6	5906	67.4
1996	6709.1	780	97.7	60.3	97.3	60.2	97.9	60.5	8629	98.2
1997	4981.2	780	72.5	60.9	72.5	60.7	72.9	61.1	6306	72.0
1998	5972.9	780	87.0	62.0	87.0	61.9	87.4	62.2	7657	87.4
1999	5989.8	780	87.2	63.0	87.2	62.9	87.7	63.2	7717	88.1
2000	6849.9	780	99.5	64.5	99.5	64.4	100.0	64.7	8784	100.0
2001	5901.0	780	86.0	65.3	86.0	65.2	86.4	65.5	7572	86.4
2002	6097.7	780	87.0	66.1	87.0	66.0	89.2	66.4	7626	87.1
2003	5470.8	780	76.4	66.5	76.4	66.4	80.1	66.9	6717	76.7
2004	6346.6	780	89.3	67.3	88.9	67.1	92.6	67.8	7839	89.2
2005	6249.5	780	86.7	67.9	86.7	67.8	91.5	68.6	7625	87.0
2006	5653.4	780	78.3	68.2	78.3	68.1	82.7	69.0	6890	78.7
2007	4521.8	780	62.5	68.1	62.5	67.9	66.2	68.9	5483	62.6
2008	4042.5	780	56.1	67.7	56.1	67.6	59.0	68.6	4949	56.3
2009	5720.1	780	79.3	68.0	79.3	67.9	83.7	69.1	6978	79.7
2010	4935.2	780	68.3	68.0	68.3	67.9	72.2	69.2	6017	68.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					291	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	2743			2280		
D. Inspection, maintenance or repair without refuelling				9		
Z. Others					16	
Subtotal	2743	0	0	2289	312	0
Total		2743			2601	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1976 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		203
16. Steam generation systems		76
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		7
42. Electrical Power Supply Systems		1
Total	0	289

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					3	
C. Inspection, maintenance or repair combined with refuelling	1754			1466		
H. Nuclear regulatory requirements					15	
J. Grid limitation, failure or grid unavailability						3
Z. Others					39	
Subtotal	1754	0	0	1466	57	3
Total		1754			1526	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		1
13. Reactor Auxiliary Systems		2
32. Feedwater and Main Steam System		0
Total	0	3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		341			10	
C. Inspection, maintenance or repair combined with refuelling	2289			1335		
J. Grid limitation, failure or grid unavailability						4
Z. Others					13	
Subtotal	2289	341	0	1335	23	4
Total		2630			1362	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		10
41. Main Generator Systems	341	
Total	341	10

JP-21 TOKAI-2

Operator: JAPCO (JAPAN ATOMIC POWER CO.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1060.0 MW(e)
 Design Net Capacity: 1056.0 MW(e)
 Design Discharge Burnup: 39500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5137.0 GW(e).h
 Energy Availability Factor: 53.9%
 Load Factor: 55.3%
 Operating Factor: 54.4%
 Energy Unavailability Factor: 46.1%
 Total Off-line Time: 3997 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	27.7	782.3	812.5	659.1	0.0	0.0	451.1	809.3	784.3	810.6	5137.0
EAF (%)	0.0	0.0	3.5	100.0	100.0	83.8	0.0	0.0	58.4	100.0	100.0	100.0	53.9
UCF (%)	0.0	0.0	3.5	100.0	100.0	83.8	0.0	0.0	58.4	100.0	100.0	100.0	53.9
LF (%)	0.0	0.0	3.5	102.5	103.0	86.4	0.0	0.0	59.1	102.6	102.8	102.8	55.3
OF (%)	0.0	0.0	6.2	100.0	100.0	84.3	0.0	0.0	60.8	100.0	100.0	100.0	54.4
EUAF (%)	100.0	100.0	96.5	0.0	0.0	16.2	100.0	100.0	41.6	0.0	0.0	0.0	46.1
PUF (%)	100.0	100.0	96.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	16.2	100.0	100.0	41.6	0.0	0.0	0.0	21.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 10 Mar 1973
 Date of First Criticality: 18/01/1978
 Date of Grid Connection: 13/03/1978
 Date of Commercial Operation: 28/11/1978

Lifetime Generation: 219791.0 GW(e).h
 Cumulative Energy Availability Factor: 72.6%
 Cumulative Load Factor: 72.9%
 Cumulative Unit Capability Factor: 72.7%
 Cumulative Energy Unavailability Factor: 27.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1978			Data not provided								
1979	5209.5	1056	56.3	56.3	56.3	56.3	56.3	56.3	56.3	5481	62.6
1980	6743.2	1056	72.6	64.5	72.6	64.5	72.7	64.5	64.5	6597	75.1
1981	6059.1	1056	65.3	64.7	65.3	64.7	65.5	64.8	64.8	6037	68.9
1982	5571.6	1056	59.6	63.5	59.6	63.5	60.2	63.7	63.7	5338	60.9
1983	6556.6	1056	70.5	64.9	70.5	64.9	70.9	65.1	65.1	6327	72.2
1984	8695.2	1056	93.5	69.6	93.5	69.6	93.7	69.9	69.9	8240	93.8
1985	6957.5	1056	75.0	70.4	75.0	70.4	75.2	70.7	70.7	6625	75.6
1986	5797.6	1056	62.5	69.4	62.5	69.4	62.7	69.7	69.7	5508	62.9
1987	7040.5	1056	76.5	70.2	76.5	70.2	76.1	70.4	70.4	6776	77.4
1988	6088.4	1056	66.0	69.8	66.0	69.8	65.6	69.9	69.9	5872	66.8
1989	8435.0	1056	91.2	71.7	91.2	71.7	91.2	71.8	71.8	8006	91.4
1990	7291.6	1056	78.9	72.3	78.9	72.3	78.8	72.4	72.4	6948	79.3
1991	7025.3	1056	76.1	72.6	76.1	72.6	75.9	72.7	72.7	6716	76.7
1992	6307.7	1080	68.6	72.3	68.5	72.3	66.5	72.2	72.2	5990	68.2
1993	8707.2	1080	93.8	73.8	93.8	73.8	92.0	73.6	73.6	8252	94.2
1994	7325.8	1056	78.9	74.1	78.9	74.1	79.2	73.9	73.9	6938	79.2
1995	6845.0	1056	73.7	74.1	73.7	74.1	74.0	73.9	73.9	6488	74.1
1996	7562.1	1056	80.8	74.4	80.7	74.4	81.5	74.4	74.4	7169	81.6
1997	8884.5	1056	95.7	75.6	95.6	75.5	96.0	75.5	75.5	8404	95.9
1998	6999.4	1056	75.1	75.5	75.0	75.5	75.7	75.5	75.5	6642	75.8
1999	2316.1	1056	25.4	73.2	24.9	73.1	25.0	73.1	73.1	2228	25.4
2000	7031.6	1056	76.3	73.3	75.4	73.2	75.8	73.2	73.2	6626	75.4
2001	5833.2	1056	62.7	72.8	62.7	72.8	63.1	72.8	72.8	5641	64.4
2002	6420.1	1056	70.0	72.7	68.9	72.6	69.4	72.6	72.6	6061	69.2
2003	9176.5	1056	98.6	73.7	98.5	73.6	99.2	73.7	73.7	8635	98.6
2004	7195.4	1060	76.5	73.9	76.3	73.7	77.3	73.8	73.8	6723	76.5
2005	5259.5	1060	55.8	73.2	55.8	73.1	56.6	73.2	73.2	4914	56.1
2006	8186.9	1060	87.9	73.7	87.3	73.6	88.2	73.7	73.7	7704	87.9
2007	7518.8	1060	80.0	73.9	80.0	73.8	81.0	74.0	74.0	7048	80.5
2008	6545.9	1060	68.8	73.8	68.8	73.6	70.3	73.9	73.9	6132	69.8
2009	5587.4	1060	58.7	73.3	58.7	73.2	60.2	73.4	73.4	5169	59.0
2010	5137.0	1060	53.9	72.7	53.9	72.6	55.3	72.9	72.9	4763	54.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1883			347	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	2119			1757		
D. Inspection, maintenance or repair without refuelling				30		
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					19	
Subtotal	2119	1883	0	1787	366	4
Total		4002			2157	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		186
13. Reactor Auxiliary Systems	1883	4
14. Safety Systems		28
15. Reactor Cooling Systems		37
31. Turbine and auxiliaries		38
32. Feedwater and Main Steam System		41
42. Electrical Power Supply Systems		11
Total	1883	345

JP-43 TOMARI-1

Operator: HEPKO (HOKKAIDO ELECTRIC POWER CO.,INC.)
Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 550.0 MW(e)
Design Net Capacity: 550.0 MW(e)
Design Discharge Burnup: 41000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3994.6 GW(e).h
Energy Availability Factor: 81.3%
Load Factor: 82.9%
Operating Factor: 81.7%
Energy Unavailability Factor: 18.7%
Total Off-line Time: 1604 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	132.9	0.0	158.5	405.3	420.2	406.0	417.1	413.1	399.7	417.6	405.4	418.9	3994.6
EAF (%)	31.7	0.0	38.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.3
UCF (%)	31.7	0.0	38.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.3
LF (%)	32.5	0.0	38.7	102.3	102.7	102.5	101.9	101.0	100.9	102.0	102.4	102.4	82.9
OF (%)	32.3	0.0	42.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.7
EUF (%)	68.3	100.0	61.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7
PUF (%)	68.3	100.0	61.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 18/04/1985
Date of First Criticality: 16/11/1988
Date of Grid Connection: 12 Jun 1988
Date of Commercial Operation: 22/06/1989

Lifetime Generation: 89474.0 GW(e).h
Cumulative Energy Availability Factor: 84.8%
Cumulative Load Factor: 85.6%
Cumulative Unit Capability Factor: 84.8%
Cumulative Energy Unavailability Factor: 15.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	2802.8	550	99.6	99.6	99.6	99.2	99.2	5136	100.0	
1990	3830.7	550	79.5	86.9	79.5	86.9	79.5	86.8	7092	81.0
1991	3540.4	550	73.5	81.7	73.5	81.7	73.5	81.6	6588	75.2
1992	3646.4	550	75.9	80.1	75.9	80.1	75.5	79.9	6780	77.2
1993	4795.2	550	100.0	84.4	100.0	84.4	99.5	84.2	8760	100.0
1994	3903.9	550	81.4	83.9	81.4	83.9	81.0	83.6	7208	82.3
1995	3946.3	550	81.9	83.6	81.9	83.6	81.9	83.4	7175	81.9
1996	3750.4	550	78.1	82.8	78.1	82.8	77.6	82.6	6920	78.8
1997	4795.6	550	100.0	84.8	100.0	84.8	99.5	84.6	8760	100.0
1998	4239.1	550	83.1	84.7	83.1	84.7	88.0	84.9	7373	84.2
1999	4074.6	550	79.7	84.2	79.7	84.2	84.6	84.9	6986	79.7
2000	4168.5	550	86.5	84.4	86.5	84.4	86.3	85.0	7598	86.5
2001	4804.0	550	100.0	85.6	100.0	85.6	99.7	86.2	8760	100.0
2002	4177.3	550	86.9	85.7	86.9	85.7	86.7	86.2	7614	86.9
2003	3821.7	550	78.7	85.2	78.7	85.2	79.3	85.8	6893	78.7
2004	3788.8	550	77.0	84.7	77.0	84.7	78.4	85.3	6762	77.0
2005	4818.8	550	98.3	85.5	98.3	85.5	100.0	86.2	8616	98.4
2006	4236.7	550	86.9	85.6	86.9	85.6	87.9	86.3	7643	87.2
2007	3952.5	550	80.6	85.3	80.6	85.3	82.0	86.0	7121	81.3
2008	3111.1	550	63.1	84.2	63.1	84.2	64.4	84.9	5578	63.5
2009	4928.2	550	100.0	85.0	100.0	85.0	102.3	85.8	8760	100.0
2010	3994.6	550	81.3	84.8	81.3	84.8	82.9	85.6	7156	81.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure						35
C. Inspection, maintenance or repair combined with refuelling	1605			1192		
Z. Others					25	
Subtotal	1605	0	0	1192	60	0
Total		1605			1252	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
32. Feedwater and Main Steam System		23
42. Electrical Power Supply Systems		12
Total	0	35

JP-44 TOMARI-2

Operator: HEPKO (HOKKAIDO ELECTRIC POWER CO.,INC.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 550.0 MW(e)
 Design Net Capacity: 550.0 MW(e)
 Design Discharge Burnup: 41000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4043.3 GW(e).h
 Energy Availability Factor: 82.1%
 Load Factor: 83.9%
 Operating Factor: 82.6%
 Energy Unavailability Factor: 17.9%
 Total Off-line Time: 1528 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	419.1	377.7	418.6	376.6	0.0	0.0	390.1	414.4	401.0	418.8	406.6	420.3	4043.3
EAF (%)	100.0	100.0	100.0	92.8	0.0	0.0	93.5	100.0	100.0	100.0	100.0	100.0	82.1
UCF (%)	100.0	100.0	100.0	92.8	0.0	0.0	93.5	100.0	100.0	100.0	100.0	100.0	82.1
LF (%)	102.4	102.2	102.3	95.1	0.0	0.0	95.3	101.3	101.3	102.4	102.7	102.7	83.9
OF (%)	100.0	100.0	100.0	93.3	0.0	0.0	97.8	100.0	100.0	100.0	100.0	100.0	82.6
EUF (%)	0.0	0.0	0.0	7.2	100.0	100.0	6.5	0.0	0.0	0.0	0.0	0.0	17.9
PUF (%)	0.0	0.0	0.0	7.2	100.0	100.0	6.5	0.0	0.0	0.0	0.0	0.0	17.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 13/06/1985
 Date of First Criticality: 25/07/1990
 Date of Grid Connection: 27/08/1990
 Date of Commercial Operation: 04 Dec 1991

Lifetime Generation: 80379.0 GW(e).h
 Cumulative Energy Availability Factor: 82.5%
 Cumulative Load Factor: 83.7%
 Cumulative Unit Capability Factor: 82.5%
 Cumulative Energy Unavailability Factor: 17.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1991	2759.6	550	76.0	76.0	76.0	76.0	76.0	76.0	5076	76.9
1992	3639.6	550	75.5	75.7	75.5	75.3	75.3	75.6	6756	76.9
1993	3847.5	550	80.0	77.3	80.0	77.3	79.9	77.2	7092	81.0
1994	4511.6	550	93.9	81.7	93.9	81.7	93.6	81.6	8232	94.0
1995	4161.9	550	85.5	82.5	85.5	82.5	86.4	82.6	7567	86.4
1996	3933.6	550	81.5	82.3	81.5	82.3	81.4	82.4	7232	82.3
1997	3775.2	550	78.5	81.8	78.5	81.8	78.4	81.8	6943	79.3
1998	5071.6	550	100.0	84.1	100.0	84.1	105.3	84.8	8760	100.0
1999	4273.2	550	83.8	84.1	83.8	84.1	88.7	85.2	7344	83.8
2000	4107.5	550	85.1	84.2	85.1	84.2	85.0	85.2	7477	85.1
2001	3971.3	550	82.6	84.0	82.6	84.0	82.4	85.0	7235	82.6
2002	4516.1	550	93.9	84.9	93.9	84.9	93.7	85.7	8228	93.9
2003	3542.0	550	71.9	83.9	71.9	83.9	73.5	84.8	6300	71.9
2004	3864.7	550	78.1	83.4	78.1	83.4	80.0	84.4	6862	78.1
2005	4252.6	550	86.0	83.6	86.0	83.6	88.3	84.7	7571	86.4
2006	4316.9	550	87.9	83.9	87.9	83.9	89.6	85.0	7704	87.9
2007	4663.2	550	94.8	84.5	94.8	84.5	96.8	85.7	8339	95.2
2008	3018.3	550	61.4	83.2	61.4	83.2	62.5	84.4	5411	61.6
2009	3436.4	550	69.6	82.5	69.6	82.5	71.3	83.7	6131	70.0
2010	4043.3	550	82.1	82.5	82.1	82.5	83.9	83.7	7232	82.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1991 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					85	
C. Inspection, maintenance or repair combined with refuelling	1528			1249		
D. Inspection, maintenance or repair without refuelling				76		
Subtotal	1528	0	0	1325	85	0
Total		1528			1410	

7. Equipment Related Full Outages, Analysis by System

System	2010	1991 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		85
Total	0	85

JP-64 TOMARI-3

Operator: HEPCO (HOKKAIDO ELECTRIC POWER CO.,INC.)
 Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 866.0 MW(e)
 Design Net Capacity: 866.0 MW(e)
 Design Discharge Burnup: 49000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7904.9 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 104.2%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	672.9	608.4	673.9	654.7	674.5	650.0	661.2	663.6	645.4	672.6	653.0	674.7	7904.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	104.4	104.5	104.6	105.0	104.7	104.3	102.6	103.0	103.5	104.4	104.7	104.7	104.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NO REFUELLING, NO OUTAGES

5. Historical Summary

Date of Construction Start: 18/11/2004
 Date of First Criticality: 03 Mar 2009
 Date of Grid Connection: 20/03/2009
 Date of Commercial Operation: 22/12/2009

Lifetime Generation: 10332.0 GW(e).h
 Cumulative Energy Availability Factor: 100.0%
 Cumulative Load Factor: 104.2%
 Cumulative Unit Capability Factor: 100.0%
 Cumulative Energy Unavailability Factor: 0.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2009	670.0	866	100.0	100.0	100.0	100.0	104.0	104.0	744	100.0
2010	7904.9	866	100.0	100.0	100.0	100.0	104.2	104.2	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2010 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External

The reactor has not yet completed a full year of commercial operation.

7. Equipment Related Full Outages, Analysis by System

System	2010	2010 to 2010
	Hours Lost	Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

JP-3 TSURUGA-1

Operator: JAPCO (JAPAN ATOMIC POWER CO.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 340.0 MW(e)
Design Net Capacity: 341.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2565.1 GW(e).h
Energy Availability Factor: 86.1%
Load Factor: 86.1%
Operating Factor: 86.4%
Energy Unavailability Factor: 13.9%
Total Off-line Time: 1192 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	253.5	228.9	253.4	245.2	253.2	80.6	8.3	249.2	242.3	252.4	244.7	253.3	2565.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	32.9	3.3	98.6	99.0	99.8	99.9	100.0	86.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	32.9	3.4	100.0	100.0	100.0	99.9	100.0	86.3
LF (%)	100.2	100.2	100.2	100.2	100.1	32.9	3.3	98.5	99.0	99.8	100.0	100.1	86.1
OF (%)	100.0	100.0	100.0	100.0	100.0	33.2	4.4	100.0	100.0	100.0	100.0	100.0	86.4
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	96.7	1.4	1.0	0.2	0.1	0.0	13.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	67.1	96.6	0.0	0.0	0.0	0.0	13.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.0	0.2	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 24/11/1966
Date of First Criticality: 10 Mar 1969
Date of Grid Connection: 16/11/1969
Date of Commercial Operation: 14/03/1970

Lifetime Generation: 79846.0 GW(e).h
Cumulative Energy Availability Factor: 67.1%
Cumulative Load Factor: 66.6%
Cumulative Unit Capability Factor: 67.3%
Cumulative Energy Unavailability Factor: 32.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1970	1797.0	357	68.5	68.5	68.5	68.5	68.5	68.5	68.5	5680	77.3
1971	2122.2	357	72.1	70.5	72.1	70.5	67.9	68.2	6312	72.1	
1972	2272.2	357	76.0	72.4	76.0	72.4	72.5	69.7	7031	80.0	
1973	2396.8	342	80.0	74.3	80.0	74.3	80.0	72.3	7485	85.4	
1974	1819.1	320	64.9	72.5	64.9	72.5	64.9	70.9	6009	68.6	
1975	1004.4	321	35.6	66.6	35.6	66.6	35.7	65.2	3301	37.7	
1976	2036.3	340	68.4	66.9	68.4	66.9	68.2	65.7	6676	76.0	
1977	1084.0	340	36.4	63.0	36.4	63.0	36.4	61.9	3548	40.5	
1978	2039.8	340	68.5	63.6	68.5	63.6	68.5	62.7	6565	74.9	
1979	1818.9	321	64.7	63.7	64.7	63.7	64.7	62.9	5873	67.0	
1980	2063.1	321	73.1	64.5	73.1	64.5	73.2	63.8	6669	75.9	
1981	663.4	340	27.1	61.4	27.1	61.4	22.3	60.2	2139	24.4	
1982	1614.0	340	59.5	61.2	59.5	61.2	54.2	59.8	5245	59.9	
1983	1972.1	340	69.8	61.8	69.8	61.8	66.2	60.2	6464	73.8	
1984	2643.1	325	92.1	63.8	92.1	63.8	92.4	62.3	8129	92.5	
1985	1703.6	340	57.3	63.4	57.3	63.4	57.2	62.0	5088	58.1	
1986	2286.3	340	77.5	64.2	77.1	64.2	76.8	62.9	6863	78.3	
1987	2349.2	340	80.2	65.1	80.2	65.1	78.9	63.8	7052	80.5	
1988	2222.9	341	74.8	65.7	74.8	65.6	74.2	64.4	6611	75.3	
1989	2457.7	341	82.8	66.5	82.8	66.5	82.3	65.3	7298	83.3	
1990	1959.8	341	65.6	66.5	65.6	66.5	65.6	65.3	5822	66.5	
1991	2255.9	341	76.6	67.0	76.1	66.9	75.5	65.8	6742	77.0	
1992	1994.1	341	66.9	67.0	66.7	66.9	66.6	65.8	5914	67.3	
1993	2623.7	341	87.5	67.8	87.5	67.8	87.8	66.7	7745	88.4	
1994	1507.5	341	50.5	67.1	50.5	67.1	50.5	66.1	4477	51.1	
1995	2328.7	341	79.7	67.6	77.3	67.5	78.0	66.5	7027	80.2	
1996	2514.2	341	84.0	68.2	84.0	68.1	83.9	67.2	7411	84.4	
1997	1936.1	341	64.8	68.1	64.8	68.0	64.8	67.1	5728	65.4	
1998	1870.5	341	62.7	67.9	62.7	67.9	62.6	66.9	5528	63.1	
1999	1845.0	341	63.2	67.8	62.5	67.6	61.8	66.8	5542	63.3	
2000	0.0	341	0.0	65.5	0.0	65.4	0.0	64.6	0	0.0	
2001	2584.5	341	86.6	66.2	86.6	66.1	86.5	65.3	7594	86.7	
2002	2546.6	341	85.5	66.8	85.3	66.7	85.3	65.9	7495	85.6	
2003	2426.3	341	81.0	67.2	80.7	67.1	81.2	66.3	7135	81.4	
2004	2535.9	341	84.2	67.7	84.1	67.6	84.7	66.9	7395	84.2	
2005	2547.6	341	85.0	68.2	85.0	68.1	85.3	67.4	7568	86.4	
2006	2845.0	340	95.1	68.9	95.0	68.8	95.5	68.2	8558	97.7	
2007	1267.1	340	42.6	68.2	42.5	68.1	42.5	67.5	3757	42.9	
2008	2276.6	340	73.3	68.4	72.7	68.2	76.2	67.7	6696	76.2	
2009	171.4	340	5.8	66.8	5.8	66.6	5.8	66.1	521	5.9	
2010	2565.1	340	86.3	67.3	86.1	67.1	86.1	66.6	7568	86.4	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1192			347	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				2030	18	
D. Inspection, maintenance or repair without refuelling				90		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				233		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	
Subtotal	0	1192	0	2353	374	2
Total		1192			2729	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		65
12. Reactor I&C Systems		94
14. Safety Systems		26
15. Reactor Cooling Systems		118
31. Turbine and auxiliaries	1192	22
32. Feedwater and Main Steam System		5
42. Electrical Power Supply Systems		9
Total	1192	339

JP-34 TSURUGA-2

Operator: JAPCO (JAPAN ATOMIC POWER CO.)

Contractor: MHI (MITSUBISHI HEAVY INDUSTRIES LTD.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1108.0 MW(e)
 Design Net Capacity: 1115.0 MW(e)
 Design Discharge Burnup: 48000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6178.2 GW(e).h
 Energy Availability Factor: 61.7%
 Load Factor: 63.7%
 Operating Factor: 62.2%
 Energy Unavailability Factor: 38.3%
 Total Off-line Time: 3314 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	850.5	542.6	0.0	0.0	0.0	0.0	579.4	841.9	814.7	852.6	832.7	863.8	6178.2
EAF (%)	100.0	70.6	0.0	0.0	0.0	0.0	68.5	100.0	100.0	100.0	100.0	100.0	61.7
UCF (%)	100.0	70.7	0.0	0.0	0.0	0.0	68.5	100.0	100.0	100.0	100.0	100.0	61.7
LF (%)	103.2	72.9	0.0	0.0	0.0	0.0	70.3	102.1	102.1	103.4	104.4	104.8	63.7
OF (%)	100.0	71.4	0.0	0.0	0.0	0.0	73.9	100.0	100.0	100.0	100.0	100.0	62.2
EUUF (%)	0.0	29.4	100.0	100.0	100.0	100.0	31.5	0.0	0.0	0.0	0.0	0.0	38.3
PUF (%)	0.0	29.4	100.0	100.0	100.0	100.0	31.5	0.0	0.0	0.0	0.0	0.0	38.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 11 Jun 1982
 Date of First Criticality: 28/05/1986
 Date of Grid Connection: 19/06/1986
 Date of Commercial Operation: 17/02/1987

Lifetime Generation: 182366.0 GW(e).h
 Cumulative Energy Availability Factor: 77.4%
 Cumulative Load Factor: 77.6%
 Cumulative Unit Capability Factor: 77.5%
 Cumulative Energy Unavailability Factor: 22.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	8498.3	1115	95.4	95.4	95.4	95.4	95.1	95.1	7656	95.5
1988	7939.7	1115	81.3	88.0	81.3	88.0	81.1	87.8	7243	82.5
1989	7507.7	1115	77.0	84.2	77.0	84.2	76.9	84.0	6814	77.8
1990	7201.0	1115	72.9	81.3	72.9	81.3	73.7	81.4	6462	73.8
1991	9259.2	1115	95.1	84.1	95.1	84.1	94.8	84.1	8338	95.2
1992	8118.7	1115	82.5	83.9	82.5	83.9	82.9	83.9	7310	83.2
1993	7844.1	1115	80.2	83.3	80.2	83.3	80.3	83.4	7086	80.9
1994	7814.6	1115	80.2	82.9	80.2	82.9	80.0	83.0	7080	80.8
1995	9220.5	1115	94.5	84.2	94.5	84.2	94.4	84.2	8290	94.6
1996	8092.3	1115	83.0	84.1	83.0	84.1	82.6	84.1	7325	83.4
1997	6522.2	1115	67.0	82.5	67.0	82.5	66.8	82.5	5946	67.9
1998	8534.6	1115	92.0	83.3	92.0	83.3	87.4	82.9	7724	88.2
1999	5131.7	1115	52.7	81.0	52.7	81.0	52.5	80.6	4615	52.7
2000	8993.8	1115	92.1	81.8	92.1	81.8	91.8	81.4	8087	92.1
2001	8072.7	1115	82.9	81.8	82.9	81.8	82.6	81.5	7267	83.0
2002	8695.5	1115	88.4	82.2	88.4	82.2	89.0	81.9	7742	88.4
2003	8460.9	1115	84.7	82.4	84.7	82.4	86.6	82.2	7418	84.7
2004	9447.0	1115	95.2	83.1	95.2	83.1	96.5	83.0	8367	95.3
2005	7693.6	1115	77.6	82.8	77.6	82.8	78.8	82.8	6854	78.2
2006	6250.8	1110	63.3	81.8	63.3	81.8	64.3	81.9	5634	64.3
2007	6065.3	1110	64.9	81.0	61.2	80.9	62.4	80.9	5688	64.9
2008	992.7	1110	10.0	77.8	10.0	77.6	10.2	77.7	957	10.9
2009	8701.1	1108	87.3	78.2	87.3	78.1	89.6	78.2	7680	87.7
2010	6178.2	1108	61.7	77.5	61.7	77.4	63.7	77.6	5446	62.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					457	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	3326			1336		
P. Fire					12	
Subtotal	3326	0	0	1336	474	0
Total	3326			1810		

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		222
14. Safety Systems		25
15. Reactor Cooling Systems		17
31. Turbine and auxiliaries		151
32. Feedwater and Main Steam System		39
Total	0	454

KR-1 KORI-1

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 576.0 MW(e)
Design Net Capacity: 565.0 MW(e)
Design Discharge Burnup: 42326 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4902.9 GW(e).h
Energy Availability Factor: 97.6%
Load Factor: 97.2%
Operating Factor: 97.5%
Energy Unavailability Factor: 2.4%
Total Off-line Time: 215 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	310.3	387.8	429.6	415.7	429.9	415.5	405.2	427.1	411.9	426.5	414.2	429.2	4902.9
EAF (%)	73.5	100.0	100.0	100.0	100.0	100.0	99.9	99.6	99.3	99.7	99.9	100.0	97.6
UCF (%)	73.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.7
LF (%)	72.4	100.2	100.2	100.2	100.3	100.2	94.6	99.7	99.3	99.5	99.9	100.2	97.2
OF (%)	75.4	100.0	100.0	100.0	100.0	100.0	95.7	100.0	100.0	100.0	100.0	100.0	97.5
EUF (%)	26.5	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.3	0.1	0.0	2.4
PUF (%)	26.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.7	0.3	0.1	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

- 2010-01-01 00:00:00 ~ 2010-01-08 14:40:00 REFUELING AND MAINTENANCE - 2010-07-16 05:12:00 UNPLANNED RX TRIP DUE TO GRID FAILURE

5. Historical Summary

Date of Construction Start: 27/04/1972
Date of First Criticality: 19/06/1977
Date of Grid Connection: 26/06/1977
Date of Commercial Operation: 29/04/1978

Lifetime Generation: 123785.1 GW(e).h
Cumulative Energy Availability Factor: 79.4%
Cumulative Load Factor: 76.0%
Cumulative Unit Capability Factor: 80.2%
Cumulative Energy Unavailability Factor: 20.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	1721.9	555	47.0	47.0	47.0	47.0	47.0	47.0	4383	66.4
1979	2952.2	564	59.8	54.3	59.8	54.3	59.8	54.3	6558	74.9
1980	3258.4	564	79.7	63.6	79.7	63.6	65.8	58.5	6982	79.5
1981	2708.1	564	69.8	65.3	69.8	65.3	54.8	57.5	6092	69.5
1982	3559.2	556	73.1	66.9	73.1	66.9	73.1	60.8	6904	78.8
1983	3065.6	556	70.1	67.5	70.1	67.5	62.9	61.1	6142	70.1
1984	3236.3	556	67.3	67.4	67.3	67.4	66.3	61.9	6321	72.0
1985	3158.9	556	66.0	67.3	64.6	67.1	64.9	62.3	6364	72.6
1986	3279.5	556	72.8	67.9	72.8	67.7	67.3	62.8	6404	73.1
1987	4557.0	556	99.8	71.1	98.9	70.9	93.6	66.0	8653	98.8
1988	2221.0	556	50.6	69.2	50.6	69.0	45.5	64.1	4449	50.6
1989	2735.9	556	59.2	68.4	59.2	68.2	56.2	63.4	5256	60.0
1990	3500.1	556	74.6	68.9	74.6	68.7	71.9	64.1	6536	74.6
1991	4365.5	556	93.6	70.7	93.3	70.5	89.6	65.9	8172	93.3
1992	3640.3	556	76.9	71.1	76.9	70.9	74.5	66.5	6759	76.9
1993	3824.9	556	81.6	71.8	81.4	71.6	78.5	67.3	7131	81.4
1994	3223.4	564	66.2	71.4	65.8	71.2	65.2	67.1	5973	68.2
1995	3969.1	556	99.1	73.0	81.2	71.8	81.5	67.9	8704	99.4
1996	3748.4	556	78.6	73.3	76.6	72.0	76.7	68.4	6936	79.0
1997	3844.2	556	79.0	73.6	78.9	72.4	78.9	68.9	7080	80.8
1998	3783.7	556	78.7	73.8	78.7	72.7	77.7	69.4	6698	76.5
1999	4153.2	556	83.3	74.2	83.3	73.2	85.3	70.1	7418	84.7
2000	4514.3	556	89.2	74.9	89.2	73.9	92.4	71.1	7932	90.3
2001	4636.5	556	92.5	75.6	92.5	74.7	95.2	72.1	8144	93.0
2002	4147.0	556	84.0	76.0	84.0	75.0	85.1	72.6	8000	91.3
2003	4550.2	556	90.9	76.6	90.1	75.6	93.4	73.4	7978	91.1
2004	4637.7	556	92.0	77.1	92.0	76.2	95.0	74.2	8131	92.6
2005	4149.5	556	82.7	77.3	82.7	76.5	85.2	74.6	7304	83.4
2006	4527.3	573	89.7	77.8	89.7	76.9	90.2	75.2	7891	90.1
2007	2142.4	569	100.0	78.5	98.8	77.7	43.0	74.1	3738	42.7
2008	4604.8	576	94.4	79.1	93.2	78.2	91.0	74.6	8090	92.1
2009	4823.8	576	95.7	79.6	95.7	78.8	95.6	75.3	8386	95.7
2010	4902.9	576	97.7	80.2	97.6	79.4	97.2	76.0	8545	97.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				1	297	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	182			1164		
D. Inspection, maintenance or repair without refuelling				126		
E. Testing of plant systems or components				16	0	
J. Grid limitation, failure or grid unavailability			31			7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						3
M. Governmental requirements or court decisions						148
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						5
Subtotal	182	0	31	1307	300	163
Total		213			1770	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		7
15. Reactor Cooling Systems		25
16. Steam generation systems		70
31. Turbine and auxiliaries		23
32. Feedwater and Main Steam System		40
35. All other I&C Systems		0
41. Main Generator Systems		96
42. Electrical Power Supply Systems		31
XX. Miscellaneous Systems		2
Total	0	294

KR-2 KORI-2

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 637.0 MW(e)
Design Net Capacity: 605.0 MW(e)
Design Discharge Burnup: 36946 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5025.6 GW(e).h
Energy Availability Factor: 90.0%
Load Factor: 90.1%
Operating Factor: 90.4%
Energy Unavailability Factor: 10.0%
Total Off-line Time: 839 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	475.4	432.0	477.6	461.5	476.9	461.1	448.2	452.1	460.3	25.0	378.6	476.8	5025.6
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.1	100.0	5.3	81.8	100.0	90.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.1	100.0	5.3	81.8	100.0	90.0
LF (%)	100.3	100.9	100.8	100.6	100.6	100.5	94.6	95.4	100.4	5.3	82.6	100.6	90.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	97.6	96.9	100.0	7.8	84.4	100.0	90.4
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	94.7	18.2	0.0	10.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.7	18.2	0.0	9.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

- 2010-07-16 05:12:00 UNPLANNED RX TRIP DUE TO GRID FAILURE- 2010-08-16 01:20:00 UNPLANNED RX TRIP DUE TO S/G LEVEL LOW-LOW - 2010-10-03 10:00:00 ~ 2010-11-05 15:37:00 REFUELING AND MAINTENANCE

5. Historical Summary

Date of Construction Start: 12 Apr 1977
Date of First Criticality: 04 Sep 1983
Date of Grid Connection: 22/04/1983
Date of Commercial Operation: 25/07/1983
Lifetime Generation: 130545.5 GW(e).h
Cumulative Energy Availability Factor: 86.4%
Cumulative Load Factor: 88.0%
Cumulative Unit Capability Factor: 86.5%
Cumulative Energy Unavailability Factor: 13.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983			Data not provided							
1984	4086.4	605	76.1	76.1	76.1	76.1	76.9	76.9	6876	78.3
1985	3731.4	605	69.8	73.0	69.8	73.0	70.4	73.7	6641	75.8
1986	3945.2	605	75.2	73.7	74.8	73.6	74.4	73.9	6555	74.8
1987	4265.4	605	82.1	75.8	81.6	75.6	80.5	75.6	7251	82.8
1988	4504.7	605	82.8	77.2	82.8	77.0	84.8	77.4	7275	82.8
1989	5062.8	605	95.7	80.3	95.7	80.2	95.5	80.4	8387	95.7
1990	4349.9	605	84.3	80.9	84.3	80.7	82.1	80.7	7381	84.3
1991	4554.0	605	85.8	81.5	85.8	81.4	85.9	81.3	7512	85.8
1992	4517.2	605	85.0	81.9	85.0	81.8	85.0	81.7	7469	85.0
1993	4187.0	605	80.5	81.7	80.5	81.6	79.0	81.5	7048	80.5
1994	4693.9	605	86.5	82.2	86.5	82.1	88.6	82.1	7685	87.7
1995	5106.6	605	94.8	83.2	94.7	83.1	96.4	83.3	8370	95.5
1996	4673.9	605	86.1	83.4	86.0	83.4	87.9	83.6	7668	87.3
1997	4620.3	605	86.8	83.7	86.6	83.6	87.2	83.9	7639	87.2
1998	4697.6	605	84.9	83.7	84.9	83.7	88.6	84.2	7541	86.1
1999	4672.2	605	83.6	83.7	83.6	83.7	88.2	84.5	7472	85.3
2000	4914.7	605	90.1	84.1	90.1	84.1	92.5	84.9	7812	88.9
2001	4807.8	605	87.3	84.3	87.3	84.2	90.7	85.3	7650	87.3
2002	5051.2	605	90.6	84.6	90.6	84.6	95.3	85.8	7982	91.1
2003	4844.2	605	86.5	84.7	85.4	84.6	91.4	86.1	7709	88.0
2004	5501.5	605	97.8	85.3	97.8	85.2	103.5	86.9	8602	97.9
2005	5151.5	605	92.1	85.7	92.1	85.6	97.2	87.4	8080	92.2
2006	5099.2	637	90.8	85.9	90.8	85.8	91.4	87.5	7984	91.1
2007	5011.0	637	89.2	86.0	89.2	85.9	89.8	87.6	7886	90.0
2008	4933.9	637	87.6	86.1	87.6	86.0	88.2	87.7	7771	88.5
2009	5176.9	637	92.2	86.3	92.2	86.3	92.8	87.9	8110	92.6
2010	5025.6	637	90.0	86.5	90.0	86.4	90.1	88.0	7921	90.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		23			126	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	797			866		
D. Inspection, maintenance or repair without refuelling				34		
E. Testing of plant systems or components					0	
J. Grid limitation, failure or grid unavailability			17			5
Subtotal	797	23	17	900	129	5
Total		837			1034	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		21
15. Reactor Cooling Systems		5
16. Steam generation systems		3
31. Turbine and auxiliaries		38
32. Feedwater and Main Steam System	23	12
35. All other I&C Systems		0
41. Main Generator Systems		40
42. Electrical Power Supply Systems		5
Total	23	124

KR-5 KORI-3

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1007.0 MW(e)
Design Net Capacity: 953.0 MW(e)
Design Discharge Burnup: 17910 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8799.7 GW(e).h
Energy Availability Factor: 99.6%
Load Factor: 99.8%
Operating Factor: 99.7%
Energy Unavailability Factor: 0.4%
Total Off-line Time: 28 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	752.3	679.9	716.1	726.5	751.5	728.0	752.3	752.4	726.6	749.7	712.8	751.5	8799.7
EAF (%)	100.0	100.0	95.1	99.9	100.0	100.0	100.0	100.0	100.0	99.8	100.0	100.0	99.6
UCF (%)	100.0	100.0	95.1	99.9	100.0	100.0	100.0	100.0	100.0	99.8	100.0	100.0	99.6
LF (%)	100.4	100.5	95.6	100.2	100.3	100.4	100.4	100.4	100.2	100.1	98.3	100.3	99.8
OF (%)	100.0	100.0	96.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7
EUf (%)	0.0	0.0	4.9	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	4.9	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNPLANNED SCRAM OCCURED IN MARCH DUE TO TURBINE CONTROL OIL LEAK

5. Historical Summary

Date of Construction Start: 10 Jan 1979 **Lifetime Generation:** 181593.0 GW(e).h
Date of First Criticality: 01 Jan 1985 **Cumulative Energy Availability Factor:** 86.4%
Date of Grid Connection: 22/01/1985 **Cumulative Load Factor:** 88.9%
Date of Commercial Operation: 30/09/1985 **Cumulative Unit Capability Factor:** 86.4%
Cumulative Energy Unavailability Factor: 13.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985			Data not provided							
1986	5611.7	895	73.3	73.3	73.3	73.3	71.6	71.6	6529	74.5
1987	5804.8	895	79.1	76.2	78.8	76.0	74.0	72.8	6665	76.1
1988	6119.7	895	79.7	77.4	79.7	77.3	77.8	74.5	7005	79.7
1989	6592.0	895	82.3	78.6	82.3	78.5	84.1	76.9	7206	82.3
1990	6838.1	895	90.4	81.0	90.4	80.9	87.2	79.0	7923	90.4
1991	5902.5	895	75.1	80.0	75.1	79.9	75.3	78.3	6578	75.1
1992	6746.2	895	83.7	80.5	83.7	80.5	85.8	79.4	7349	83.7
1993	7121.8	895	88.1	81.5	88.1	81.4	90.8	80.8	7721	88.1
1994	6545.3	890	79.3	81.2	79.2	81.2	84.0	81.2	7128	81.4
1995	6015.5	895	73.7	80.5	73.7	80.4	76.7	80.7	6863	78.3
1996	7939.7	895	95.4	81.9	95.4	81.8	101.0	82.6	8431	96.0
1997	6051.9	895	73.8	81.2	73.8	81.1	77.2	82.1	6503	74.2
1998	6902.5	895	82.9	81.3	82.8	81.3	88.0	82.6	7325	83.6
1999	7231.8	895	86.3	81.7	86.3	81.6	92.2	83.3	7615	86.9
2000	8094.3	895	95.6	82.6	95.6	82.6	103.0	84.6	8399	95.6
2001	7570.3	895	89.4	83.0	89.4	83.0	96.6	85.3	7881	90.0
2002	7684.8	895	90.9	83.5	90.9	83.5	98.0	86.1	8062	92.0
2003	8387.4	895	100.0	84.4	99.1	84.3	107.0	87.2	8689	99.2
2004	7312.5	895	86.5	84.5	86.5	84.4	93.0	87.5	7630	86.9
2005	7562.2	895	89.4	84.8	89.4	84.7	96.5	88.0	7885	90.0
2006	7461.8	963	88.3	84.9	88.3	84.9	88.5	88.0	7813	89.2
2007	8214.2	964	96.4	85.5	96.4	85.4	97.3	88.5	8503	97.1
2008	7564.4	979	88.9	85.7	88.8	85.6	88.0	88.4	7854	89.4
2009	7599.6	1007	89.0	85.8	89.0	85.7	88.4	88.4	7820	89.3
2010	8799.7	1007	99.6	86.4	99.6	86.4	99.8	88.9	8732	99.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		27			87	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling				952		
D. Inspection, maintenance or repair without refuelling				23		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				36		
J. Grid limitation, failure or grid unavailability						4
L. Human factor related					3	
Subtotal	0	27	0	1011	96	4
Total		27			1111	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		15
15. Reactor Cooling Systems		2
16. Steam generation systems		4
31. Turbine and auxiliaries	27	14
32. Feedwater and Main Steam System		8
35. All other I&C Systems		6
41. Main Generator Systems		34
42. Electrical Power Supply Systems		0
Total	27	83

KR-6 KORI-4

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1007.0 MW(e)
 Design Net Capacity: 953.0 MW(e)
 Design Discharge Burnup: 18210 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8218.2 GW(e).h
 Energy Availability Factor: 93.5%
 Load Factor: 93.2%
 Operating Factor: 93.8%
 Energy Unavailability Factor: 6.5%
 Total Off-line Time: 543 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	751.9	679.4	752.2	728.4	223.3	685.7	752.1	750.6	724.9	749.9	701.5	718.1	8218.2
EAF (%)	100.0	100.0	100.0	100.0	29.7	94.3	100.0	100.0	99.9	100.0	100.0	100.0	93.5
UCF (%)	100.0	100.0	100.0	100.0	29.7	94.3	100.0	100.0	100.0	100.0	100.0	100.0	93.6
LF (%)	100.4	100.4	100.4	100.5	29.8	94.6	100.4	100.2	100.0	100.1	96.8	95.9	93.2
OF (%)	100.0	100.0	100.0	100.0	30.4	96.5	100.0	100.0	100.0	100.0	100.0	100.0	93.8
EUUF (%)	0.0	0.0	0.0	0.0	70.3	5.7	0.0	0.0	0.1	0.0	0.0	0.0	6.5
PUF (%)	0.0	0.0	0.0	0.0	70.3	5.7	0.0	0.0	0.0	0.0	0.0	0.0	6.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

19TH REFUELING AND MAINTENANCE('10.05.10 ~ '10.06.02)

5. Historical Summary

Date of Construction Start: 04 Jan 1980
 Date of First Criticality: 26/10/1985
 Date of Grid Connection: 15/11/1985
 Date of Commercial Operation: 29/04/1986

Lifetime Generation: 180631.2 GW(e).h
 Cumulative Energy Availability Factor: 87.7%
 Cumulative Load Factor: 90.5%
 Cumulative Unit Capability Factor: 87.9%
 Cumulative Energy Unavailability Factor: 12.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986			Data not provided							
1987	5860.8	895	78.3	78.3	78.0	78.0	74.8	74.8	6707	76.6
1988	5909.1	895	80.7	79.5	79.8	79.8	75.2	75.0	7006	79.8
1989	6177.4	895	77.2	78.7	77.2	78.3	78.8	76.2	6763	77.2
1990	6230.0	895	81.5	79.4	81.5	79.1	79.5	77.0	7140	81.5
1991	6353.0	895	80.4	79.6	80.0	79.3	81.0	77.8	7011	80.0
1992	6652.3	895	82.7	80.1	82.7	79.9	84.6	79.0	7266	82.7
1993	6835.9	895	85.1	80.9	85.1	80.6	87.2	80.1	7456	85.1
1994	7455.1	890	90.0	82.0	90.0	81.8	95.6	82.1	8160	93.2
1995	6950.6	890	89.3	82.8	89.3	82.6	89.2	82.9	7824	89.3
1996	6678.4	895	80.0	82.5	80.0	82.4	84.9	83.1	7147	81.4
1997	7014.2	895	84.4	82.7	84.4	82.5	89.5	83.6	7450	85.0
1998	8433.7	895	100.0	84.1	100.0	84.0	107.6	85.6	8760	100.0
1999	7129.0	895	84.6	84.2	84.6	84.0	90.9	86.0	7451	85.1
2000	7334.4	895	86.2	84.3	86.2	84.2	93.3	86.6	7578	86.3
2001	7615.1	895	90.0	84.7	90.0	84.6	97.1	87.3	7929	90.5
2002	8495.5	895	100.0	85.6	100.0	85.5	108.4	88.6	8760	100.0
2003	7597.0	895	90.5	85.9	89.6	85.8	96.9	89.1	7913	90.3
2004	7378.6	895	86.8	86.0	86.8	85.8	93.9	89.3	7669	87.3
2005	8397.2	895	99.2	86.7	99.2	86.5	107.1	90.3	8695	99.3
2006	7520.4	967	90.7	86.9	90.7	86.8	88.8	90.2	7824	89.3
2007	7500.9	966	88.0	87.0	88.0	86.8	88.6	90.1	7967	90.9
2008	8348.2	977	98.8	87.5	97.6	87.4	97.3	90.5	8674	98.7
2009	7836.8	1007	89.0	87.6	89.0	87.4	89.1	90.4	7779	88.8
2010	8218.2	1007	93.6	87.9	93.5	87.7	93.2	90.5	8217	93.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					31	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	543			886		
D. Inspection, maintenance or repair without refuelling				23		
E. Testing of plant systems or components					0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				43		
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
Subtotal	543	0	0	952	32	7
Total		543			991	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
15. Reactor Cooling Systems		3
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		6
41. Main Generator Systems		0
42. Electrical Power Supply Systems		9
Total	0	28

KR-9 ULCHIN-1

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 945.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 42500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7437.8 GW(e).h
Energy Availability Factor: 89.8%
Load Factor: 89.8%
Operating Factor: 91.2%
Energy Unavailability Factor: 10.2%
Total Off-line Time: 772 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	700.9	632.7	700.2	677.0	700.2	678.5	700.0	564.9	15.3	686.7	678.3	703.1	7437.8
EAF (%)	99.7	99.6	99.6	99.5	99.6	99.7	99.6	80.3	2.2	97.7	99.7	99.9	89.8
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.5	2.2	98.4	99.9	99.9	90.2
LF (%)	99.7	99.6	99.6	99.5	99.6	99.7	99.6	80.3	2.2	97.7	99.7	100.0	89.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.4	4.7	100.0	100.0	100.0	91.2
EUf (%)	0.3	0.4	0.4	0.5	0.4	0.3	0.4	19.7	97.8	2.3	0.3	0.1	10.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.8	97.8	1.6	0.1	0.1	9.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.3	0.4	0.4	0.5	0.4	0.3	0.4	0.2	0.0	0.7	0.2	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

17TH REFUELING (2010.08.28 ~ 2010.09.29)

5. Historical Summary

Date of Construction Start: 26/01/1983
Date of First Criticality: 25/02/1988
Date of Grid Connection: 04 Jul 1988
Date of Commercial Operation: 09 Oct 1988

Lifetime Generation: 157884.1 GW(e).h
Cumulative Energy Availability Factor: 86.6%
Cumulative Load Factor: 86.8%
Cumulative Unit Capability Factor: 86.9%
Cumulative Energy Unavailability Factor: 13.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988			Data not provided							
1989	5205.4	920	66.4	66.4	66.4	66.4	64.6	64.6	5821	66.4
1990	6166.2	920	81.7	74.1	81.7	74.1	76.5	70.6	7156	81.7
1991	7244.3	920	91.0	79.7	91.0	79.7	89.9	77.0	7970	91.0
1992	7020.8	920	87.4	81.6	87.4	81.6	86.9	79.5	7675	87.4
1993	6977.6	920	87.3	82.8	87.3	82.8	86.6	80.9	7651	87.3
1994	6878.5	890	82.0	82.6	82.0	82.6	88.2	82.1	7293	83.3
1995	7153.8	920	85.7	83.1	85.7	83.1	88.8	83.0	7698	87.9
1996	7113.7	920	85.6	83.4	85.4	83.4	88.0	83.7	7631	86.9
1997	6801.0	920	83.7	83.4	82.3	83.3	84.4	83.7	7323	83.6
1998	7643.0	920	94.1	84.5	91.4	84.1	94.8	84.9	8256	94.2
1999	7161.6	920	86.1	84.7	86.1	84.3	88.9	85.2	7639	87.2
2000	7230.8	920	86.8	84.8	86.3	84.4	89.5	85.6	7736	88.1
2001	7022.3	920	85.1	84.9	84.5	84.4	87.1	85.7	7483	85.4
2002	5462.4	920	76.0	84.2	76.0	83.8	67.8	84.4	6052	69.1
2003	6371.6	920	85.2	84.3	85.2	83.9	79.1	84.1	7446	85.0
2004	7420.1	920	89.5	84.6	89.3	84.3	91.8	84.5	7970	90.7
2005	8245.0	920	99.9	85.5	99.8	85.2	102.3	85.6	8760	100.0
2006	7212.8	939	88.1	85.7	87.5	85.3	87.7	85.7	7769	88.7
2007	7262.2	940	88.0	85.8	88.0	85.5	88.2	85.8	7747	88.4
2008	8177.4	945	99.2	86.5	99.1	86.2	98.5	86.5	8747	99.6
2009	7493.1	945	91.0	86.7	91.0	86.4	90.5	86.7	8024	91.6
2010	7437.8	945	90.2	86.9	89.8	86.6	89.8	86.8	7988	91.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				117	152	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling	772			831		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Subtotal	772	0	0	948	161	5
Total		772			1114	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
15. Reactor Cooling Systems		3
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		5
41. Main Generator Systems		204
42. Electrical Power Supply Systems		7
Total	0	223

KR-10 ULCHIN-2

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
 Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 942.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 42500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7506.9 GW(e).h
 Energy Availability Factor: 90.8%
 Load Factor: 91.0%
 Operating Factor: 91.2%
 Energy Unavailability Factor: 9.2%
 Total Off-line Time: 769 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	701.3	632.4	573.8	51.3	703.2	681.1	702.5	702.3	675.5	700.1	680.4	703.0	7506.9
EAF (%)	100.0	99.9	81.9	7.6	100.0	100.0	100.0	100.0	99.6	99.9	100.0	100.0	90.8
UCF (%)	100.0	100.0	82.0	7.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.9
LF (%)	100.1	99.9	81.9	7.6	100.3	100.4	100.2	100.2	99.6	99.9	100.3	100.3	91.0
OF (%)	100.0	100.0	83.2	10.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.2
EUf (%)	0.0	0.1	18.1	92.4	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	9.2
PUf (%)	0.0	0.0	18.0	92.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

16TH REFUELING (2010.03.26 ~ 2010.04.27)

5. Historical Summary

Date of Construction Start: 07 May 1983
 Date of First Criticality: 25/02/1989
 Date of Grid Connection: 14/04/1989
 Date of Commercial Operation: 30/09/1989

Lifetime Generation: 153375.7 GW(e).h
 Cumulative Energy Availability Factor: 87.6%
 Cumulative Load Factor: 88.9%
 Cumulative Unit Capability Factor: 87.8%
 Cumulative Energy Unavailability Factor: 12.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989			Data not provided							
1990	5547.3	920	73.0	73.0	73.0	73.0	68.8	68.8	6395	73.0
1991	6671.2	920	86.8	79.9	86.8	79.9	82.8	75.8	7603	86.8
1992	7076.9	920	87.5	82.4	87.5	82.4	87.6	79.7	7686	87.5
1993	7230.2	920	87.8	83.8	87.8	83.8	89.7	82.2	7693	87.8
1994	6889.7	890	81.5	83.3	81.5	83.3	88.4	83.4	7315	83.5
1995	7810.3	920	93.4	85.0	93.4	85.0	96.9	85.7	8223	93.9
1996	7696.4	920	91.3	85.9	91.0	85.9	95.2	87.1	8151	92.8
1997	7055.2	920	86.0	85.9	84.3	85.7	87.5	87.1	7534	86.0
1998	7388.9	920	88.5	86.2	88.3	86.0	91.7	87.6	7947	90.7
1999	7815.2	920	94.6	87.1	94.5	86.8	97.0	88.6	8748	99.9
2000	6836.8	920	82.5	86.6	82.3	86.4	84.6	88.2	7330	83.4
2001	7268.6	920	90.2	86.9	89.2	86.7	90.2	88.4	7848	89.6
2002	6485.8	920	78.3	86.3	78.3	86.0	80.5	87.8	6939	79.2
2003	7253.8	920	87.1	86.3	87.1	86.1	90.0	87.9	7686	87.7
2004	7253.7	920	88.6	86.5	88.6	86.3	89.8	88.0	7888	89.8
2005	6582.4	920	80.8	86.1	80.7	85.9	81.7	87.6	7218	82.4
2006	7882.5	937	97.0	86.8	96.7	86.6	96.0	88.1	8510	97.1
2007	7391.6	937	90.0	87.0	90.0	86.8	90.1	88.3	7946	90.7
2008	7264.2	942	87.9	87.0	87.9	86.8	87.8	88.2	7752	88.3
2009	8258.3	942	100.0	87.7	100.0	87.5	100.1	88.8	8760	100.0
2010	7506.9	942	90.9	87.8	90.8	87.6	91.0	88.9	7991	91.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					111	
C. Inspection, maintenance or repair combined with refuelling	769			860		
D. Inspection, maintenance or repair without refuelling				59		
E. Testing of plant systems or components					2	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						7
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Subtotal	769	0	0	919	113	7
Total		769			1039	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		55
32. Feedwater and Main Steam System		2
41. Main Generator Systems		49
42. Electrical Power Supply Systems		3
Total	0	109

KR-13 ULCHIN-3

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPANY)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 994.0 MW(e)
Design Net Capacity: 1050.0 MW(e)
Design Discharge Burnup: 45800 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8740.7 GW(e).h
Energy Availability Factor: 99.9%
Load Factor: 100.4%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.1%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	743.6	672.6	745.0	721.5	743.7	717.9	742.1	741.5	710.5	740.6	718.8	743.1	8740.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2	100.0	100.0	100.0	99.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.3	100.0	100.0	100.0	99.9
LF (%)	100.5	100.7	100.7	100.8	100.6	100.3	100.3	100.3	99.3	100.1	100.4	100.5	100.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.1
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 21/07/1993
Date of First Criticality: 21/12/1997
Date of Grid Connection: 01 Jun 1998
Date of Commercial Operation: 08 Nov 1998

Lifetime Generation: 100308.9 GW(e).h
Cumulative Energy Availability Factor: 91.6%
Cumulative Load Factor: 91.4%
Cumulative Unit Capability Factor: 91.8%
Cumulative Energy Unavailability Factor: 8.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1998	3495.9	960	100.0	100.0	100.0	100.0	99.2	99.2	3589	97.7
1999	6918.0	960	81.4	86.9	79.7	85.7	82.3	87.3	7149	81.6
2000	7489.1	960	87.0	87.0	87.0	86.2	88.8	87.9	7734	88.0
2001	7922.2	960	91.3	88.2	91.3	87.7	94.2	89.7	8025	91.6
2002	7031.3	960	89.0	88.4	89.0	88.0	83.6	88.4	7824	89.3
2003	7984.3	960	99.6	90.4	99.6	90.1	94.9	89.6	8758	100.0
2004	7187.6	960	90.0	90.4	90.0	90.1	85.2	88.9	7986	90.9
2005	7651.7	960	87.7	90.0	87.6	89.8	91.0	89.2	7834	89.4
2006	8425.9	994	96.6	90.8	96.6	90.6	96.8	90.1	8501	97.0
2007	7901.9	995	90.3	90.8	90.3	90.6	90.7	90.2	7970	91.0
2008	8034.7	994	91.7	90.9	91.7	90.7	92.0	90.3	8122	92.5
2009	8149.7	994	93.3	91.1	93.2	90.9	93.6	90.6	8225	93.9
2010	8740.7	994	99.9	91.8	99.9	91.6	100.4	91.4	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1999 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					47	
C. Inspection, maintenance or repair combined with refuelling				647		
Subtotal	0	0	0	647	47	0
Total	0			694		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1999 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		18
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		2
41. Main Generator Systems		24
Total	0	46

KR-14 ULCHIN-4

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPANY)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 998.0 MW(e)
Design Net Capacity: 1050.0 MW(e)
Design Discharge Burnup: 46603 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8110.6 GW(e).h
Energy Availability Factor: 92.6%
Load Factor: 92.8%
Operating Factor: 93.0%
Energy Unavailability Factor: 7.4%
Total Off-line Time: 611 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	742.6	670.6	743.5	719.2	506.1	308.5	744.8	744.7	719.0	743.5	721.7	746.3	8110.6
EAF (%)	100.0	100.0	100.0	100.0	68.1	42.9	100.0	100.0	100.0	100.0	100.0	100.0	92.6
UCF (%)	100.0	100.0	100.0	100.0	68.3	43.0	100.0	100.0	100.0	100.0	100.0	100.0	92.6
LF (%)	100.0	100.0	100.1	100.1	68.2	42.9	100.3	100.3	100.1	100.1	100.4	100.5	92.8
OF (%)	100.0	100.0	100.0	100.0	69.1	47.1	100.0	100.0	100.0	100.0	100.0	100.0	93.0
EUf (%)	0.0	0.0	0.0	0.0	31.9	57.1	0.0	0.0	0.0	0.0	0.0	0.0	7.4
PUf (%)	0.0	0.0	0.0	0.0	31.7	57.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

9TH REFUELING AND MAINTENANCE

5. Historical Summary

Date of Construction Start: 11 Jan 1993 **Lifetime Generation:** 94313.8 GW(e).h
Date of First Criticality: 14/12/1998 **Cumulative Energy Availability Factor:** 90.9%
Date of Grid Connection: 28/12/1998 **Cumulative Load Factor:** 92.7%
Date of Commercial Operation: 31/12/1999 **Cumulative Unit Capability Factor:** 91.0%
Cumulative Energy Unavailability Factor: 9.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1999			Data not provided							
2000	7042.5	960	81.3	81.3	81.3	81.3	83.5	83.5	7229	82.3
2001	7732.3	960	90.0	85.6	89.9	85.6	91.9	87.7	7880	90.0
2002	7311.3	960	84.0	85.1	83.8	85.0	86.9	87.5	7448	85.0
2003	7922.5	960	91.6	86.7	91.6	86.7	94.2	89.1	8081	92.2
2004	8623.1	960	98.7	89.1	98.7	89.1	102.3	91.8	8700	99.0
2005	8003.0	960	91.5	89.5	91.3	89.4	95.2	92.3	8085	92.3
2006	7886.2	993	89.8	89.6	89.8	89.5	90.7	92.1	7938	90.6
2007	7912.9	992	91.0	89.7	90.3	89.6	91.1	92.0	7998	91.3
2008	8762.8	998	100.0	90.9	100.0	90.8	100.0	92.9	8784	100.0
2009	7924.4	998	90.6	90.9	90.6	90.8	90.6	92.6	8047	91.9
2010	8110.6	998	92.6	91.0	92.6	90.9	92.8	92.7	8149	93.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					40	
C. Inspection, maintenance or repair combined with refuelling	611			636		
L. Human factor related					0	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
Subtotal	611	0	0	636	40	3
Total		611			679	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2000 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		8
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		5
41. Main Generator Systems		7
42. Electrical Power Supply Systems		17
Total	0	38

KR-19 ULCHIN-5

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPANY)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 997.0 MW(e)
 Design Net Capacity: 1050.0 MW(e)
 Design Discharge Burnup: 38723 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8160.3 GW(e).h
 Energy Availability Factor: 93.2%
 Load Factor: 93.4%
 Operating Factor: 94.1%
 Energy Unavailability Factor: 6.8%
 Total Off-line Time: 515 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	743.8	671.6	743.1	719.4	743.6	719.0	741.7	739.8	364.7	507.9	720.7	745.0	8160.3
EAF (%)	100.0	100.0	99.9	100.0	100.0	100.0	99.9	99.7	50.8	68.4	100.0	100.0	93.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	56.0	68.4	100.0	100.0	93.7
LF (%)	100.3	100.2	100.2	100.2	100.3	100.2	100.0	99.7	50.8	68.5	100.4	100.4	93.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	57.5	71.9	100.0	100.0	94.1
EUF (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	49.2	31.6	0.0	0.0	6.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.0	31.6	0.0	0.0	6.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	5.2	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5TH REFUELING AND MAINTENANCE

5. Historical Summary

Date of Construction Start: 10 Jan 1999 Lifetime Generation: 52783.4 GW(e).h
 Date of First Criticality: 28/11/2003 Cumulative Energy Availability Factor: 92.2%
 Date of Grid Connection: 18/12/2003 Cumulative Load Factor: 91.8%
 Date of Commercial Operation: 29/07/2004 Cumulative Unit Capability Factor: 92.3%
 Cumulative Energy Unavailability Factor: 7.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2004	3648.4	960	98.2	98.2	98.2	98.2	86.0	86.0	3669	83.1
2005	7321.6	960	83.8	88.6	83.8	88.6	87.1	86.7	7409	84.6
2006	7882.8	994	90.6	89.4	90.6	89.4	90.5	88.3	7925	90.5
2007	8025.9	995	91.9	90.1	91.9	90.1	92.1	89.4	8115	92.6
2008	8763.8	1001	100.0	92.4	99.9	92.3	99.7	91.7	8784	100.0
2009	7924.2	1001	90.7	92.1	90.7	92.1	90.4	91.5	7988	91.2
2010	8160.3	997	93.7	92.3	93.2	92.2	93.4	91.8	8245	94.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2004 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure C. Inspection, maintenance or repair combined with refuelling	515			487	38	
Subtotal	515	0	0	487	38	0
Total		515			525	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2004 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		10
12. Reactor I&C Systems		26
35. All other I&C Systems		2
Total	0	38

KR-20 ULCHIN-6

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPANY)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 997.0 MW(e)
 Design Net Capacity: 1050.0 MW(e)
 Design Discharge Burnup: 38829 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7991.0 GW(e).h
 Energy Availability Factor: 91.4%
 Load Factor: 91.5%
 Operating Factor: 92.0%
 Energy Unavailability Factor: 8.6%
 Total Off-line Time: 705 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	742.3	360.0	312.0	719.6	743.3	718.8	741.5	740.5	713.2	738.8	718.1	742.9	7991.0
EAF (%)	100.0	53.7	42.0	100.0	100.0	100.0	99.9	99.8	99.4	100.0	99.9	100.0	91.4
UCF (%)	100.0	54.2	42.0	100.0	100.0	100.0	100.0	100.0	99.8	100.0	100.0	100.0	91.5
LF (%)	100.1	53.7	42.1	100.2	100.2	100.1	100.0	99.8	99.4	99.6	100.0	100.2	91.5
OF (%)	100.0	55.1	45.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.0
EUf (%)	0.0	46.3	58.0	0.0	0.0	0.0	0.1	0.2	0.6	0.0	0.1	0.0	8.6
PUf (%)	0.0	45.8	58.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.5	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.1	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

REFUELING AND MAINTENANCE

5. Historical Summary

Date of Construction Start: 29/09/2000 Lifetime Generation: 47204.2 GW(e).h
 Date of First Criticality: 16/12/2004 Cumulative Energy Availability Factor: 93.1%
 Date of Grid Connection: 01 Jul 2005 Cumulative Load Factor: 92.2%
 Date of Commercial Operation: 22/04/2005 Cumulative Unit Capability Factor: 93.2%
 Cumulative Energy Unavailability Factor: 6.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2005	6011.0	960	99.0	99.0	99.0	99.0	94.9	94.9	6041	91.5
2006	7409.9	991	86.7	91.8	86.7	91.8	85.4	89.4	7543	86.1
2007	7911.3	994	91.6	91.8	90.9	91.5	90.9	89.9	8022	91.6
2008	8107.9	1001	92.6	92.0	92.6	91.8	92.2	90.5	8168	93.0
2009	8694.5	1001	99.5	93.6	99.5	93.4	99.2	92.4	8724	99.6
2010	7991.0	997	91.5	93.2	91.4	93.1	91.5	92.2	8055	92.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2005 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					28	
C. Inspection, maintenance or repair combined with refuelling	704			407		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						8
Subtotal	704	0	0	407	28	8
Total		704			443	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2005 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		9
41. Main Generator Systems		13
42. Electrical Power Supply Systems		6
Total	0	28

KR-3 WOLSONG-1

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 597.0 MW(e)
Design Net Capacity: 629.0 MW(e)
Design Discharge Burnup: 7500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
Energy Availability Factor: 0.0%
Load Factor: 0.0%
Operating Factor: 0.0%
Energy Unavailability Factor: 100.0%
Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUf (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

21TH OVERHAUL(WITH REFURBISHMENT): 2009.04.01 ~ CONTINUE

5. Historical Summary

Date of Construction Start: 30/10/1977 **Lifetime Generation:** 124829.5 GW(e).h
Date of First Criticality: 21/11/1982 **Cumulative Energy Availability Factor:** 79.1%
Date of Grid Connection: 31/12/1982 **Cumulative Load Factor:** 81.7%
Date of Commercial Operation: 22/04/1983 **Cumulative Unit Capability Factor:** 79.5%
Cumulative Energy Unavailability Factor: 20.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2507.4	628	60.4	60.4	60.4	60.4	60.5	60.5	5095	77.2
1984	3693.2	629	66.8	64.1	66.8	64.1	66.8	64.1	6202	70.6
1985	5246.5	629	95.7	75.6	94.0	74.9	95.2	75.4	8277	94.5
1986	4420.4	629	80.9	77.0	80.8	76.5	80.2	76.7	7079	80.8
1987	5155.8	629	94.4	80.7	93.9	80.2	93.6	80.2	8185	93.4
1988	4415.3	629	80.1	80.6	80.1	80.1	79.9	80.2	7033	80.1
1989	5053.2	629	68.8	78.8	68.8	78.5	91.7	81.9	8036	91.7
1990	4770.3	629	86.0	79.7	86.0	79.4	86.6	82.5	7532	86.0
1991	5062.0	629	90.5	81.0	90.5	80.7	91.9	83.6	7927	90.5
1992	4843.3	629	85.5	81.4	85.5	81.2	87.7	84.0	7510	85.5
1993	5611.3	629	99.0	83.1	99.0	82.8	101.8	85.6	8671	99.0
1994	4583.1	629	80.5	82.8	80.4	82.6	83.2	85.4	7150	81.6
1995	4647.1	629	80.9	82.7	80.9	82.5	84.3	85.3	7266	82.9
1996	4508.2	629	78.5	82.4	78.0	82.2	81.6	85.1	7029	80.0
1997	5689.6	629	99.6	83.6	99.6	83.3	103.3	86.3	8732	99.7
1998	4360.4	629	76.5	83.1	76.5	82.9	79.1	85.9	6730	76.8
1999	4613.0	629	80.7	83.0	80.7	82.8	83.7	85.7	7087	80.9
2000	4511.6	629	79.0	82.7	79.0	82.6	81.7	85.5	6993	79.6
2001	4622.0	629	81.3	82.7	81.3	82.5	83.9	85.4	7153	81.7
2002	5516.2	629	97.2	83.4	97.1	83.2	100.1	86.2	8543	97.5
2003	4980.0	629	88.1	83.6	88.1	83.5	90.4	86.4	7715	88.1
2004	5027.5	629	89.4	83.9	88.2	83.7	91.0	86.6	7855	89.4
2005	4296.3	629	82.5	83.8	75.9	83.3	78.0	86.2	7261	82.9
2006	4627.6	578	90.2	84.1	90.2	83.6	91.4	86.4	7998	91.3
2007	4721.9	578	88.3	84.2	88.3	83.8	93.3	86.7	7955	90.8
2008	4885.6	597	91.8	84.5	91.8	84.1	93.2	86.9	8387	95.5
2009	1218.3	597	23.2	82.3	23.2	81.9	23.3	84.6	2150	24.5
2010	0.0	597	0.0	79.5	0.0	79.1	0.0	81.7	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					82	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling				637		
D. Inspection, maintenance or repair without refuelling				325		
E. Testing of plant systems or components				3		
G. Major back-fitting, refurbishment or upgrading activities without refuelling	8760			235		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						5
L. Human factor related					2	
Subtotal	8760	0	0	1200	87	7
Total		8760			1294	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		35
13. Reactor Auxiliary Systems		4
14. Safety Systems		4
15. Reactor Cooling Systems		10
16. Steam generation systems		1
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System		8
41. Main Generator Systems		2
42. Electrical Power Supply Systems		3
Total	0	76

KR-4 WOLSONG-2

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: AECL/DHI (ATOMIC ENERGY OF CANADA LTD./DOOSAN HEAVY INDUSTRY & CONSTRUCTION)

1. Station Details

Type:	PHWR
Net Reference Unit Power (RUP) at the beginning of 2010:	710.0 MW(e)
Design Net Capacity:	663.0 MW(e)
Design Discharge Burnup:	7500 MW.d/t
Status at end of year:	Operational

2. Production Summary 2010

Net Energy Production:	5774.3 GW(e).h
Energy Availability Factor:	92.7%
Load Factor:	92.8%
Operating Factor:	93.1%
Energy Unavailability Factor:	7.3%
Total Off-line Time:	608 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	529.6	478.8	530.4	513.5	530.7	510.0	525.0	525.9	505.1	524.1	197.1	403.9	5774.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	99.7	99.4	99.5	98.8	99.2	38.5	76.5	92.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	38.6	76.5	93.0
LF (%)	100.3	100.4	100.4	100.5	100.5	99.8	99.4	99.6	98.8	99.2	38.6	76.5	92.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	38.9	77.4	93.1
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.5	1.2	0.8	61.5	23.5	7.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	61.4	23.5	7.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.5	1.2	0.8	0.1	0.1	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

11TH OVERHAUL(2010.11.12 ~ 2010.12.07) - INSPECTION AND MAINTENANCE

5. Historical Summary

Date of Construction Start:	22/06/1992	Lifetime Generation:	76075.9 GW(e).h
Date of First Criticality:	29/01/1997	Cumulative Energy Availability Factor:	91.4%
Date of Grid Connection:	04 Jan 1997	Cumulative Load Factor:	94.2%
Date of Commercial Operation:	07 Jan 1997	Cumulative Unit Capability Factor:	91.5%
		Cumulative Energy Unavailability Factor:	8.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1997	2804.3	650	94.7	94.7	94.7	94.7	97.7	97.7	4199	95.1
1998	4788.7	650	81.0	85.6	81.0	85.6	84.1	88.7	7144	81.6
1999	5211.8	650	88.1	86.6	88.1	86.6	91.5	89.8	7754	88.5
2000	5346.8	650	91.5	88.0	91.5	88.0	93.6	90.9	7843	89.3
2001	5585.4	650	93.0	89.1	92.8	89.1	98.1	92.5	8188	93.5
2002	5266.0	650	87.7	88.8	87.7	88.8	92.5	92.5	7717	88.1
2003	5480.6	650	91.2	89.2	91.2	89.2	96.3	93.1	8015	91.5
2004	5465.5	650	90.9	89.4	90.9	89.4	95.7	93.4	8015	91.2
2005	5641.3	650	93.9	90.0	93.9	89.9	99.1	94.1	8243	94.1
2006	5975.8	684	99.3	91.0	99.3	91.0	99.7	94.7	8711	99.4
2007	5618.8	683	90.6	91.0	90.6	90.9	93.9	94.6	7948	90.7
2008	5700.3	710	92.1	91.1	92.0	91.0	91.4	94.3	8081	92.0
2009	5845.9	710	94.2	91.3	93.9	91.3	94.0	94.3	8265	94.3
2010	5774.3	710	93.0	91.5	92.7	91.4	92.8	94.2	8152	93.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1997 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					21	
C. Inspection, maintenance or repair combined with refuelling				304		
D. Inspection, maintenance or repair without refuelling	608			343		
J. Grid limitation, failure or grid unavailability						5
L. Human factor related					2	
Subtotal	608	0	0	647	23	5
Total		608			675	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1997 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		4
16. Steam generation systems		3
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		6
41. Main Generator Systems		2
42. Electrical Power Supply Systems		0
Total	0	18

KR-15 WOLSONG-3

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: AECL/DHI (ATOMIC ENERGY OF CANADA LTD./DOOSAN HEAVY INDUSTRY & CONSTRUCTION)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUP at the beginning of 2010): 707.0 MW(e)
Design Net Capacity: 665.0 MW(e)
Design Discharge Burnup: 7296 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5986.4 GW(e).h
Energy Availability Factor: 96.2%
Load Factor: 96.7%
Operating Factor: 96.3%
Energy Unavailability Factor: 3.8%
Total Off-line Time: 327 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	529.6	478.5	529.8	512.5	530.4	511.3	524.8	529.2	507.5	525.3	511.6	296.0	5986.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.6	99.8	100.0	55.9	96.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	55.9	96.3
LF (%)	100.7	100.7	100.7	100.7	100.8	100.4	99.8	100.6	99.7	99.9	100.5	56.3	96.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	56.0	96.3
EUAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.2	0.0	44.1	3.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.1	3.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.2	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

INSPECTION AND MAINTENANCE(2010.12.18 ~ 2011.01.12)

5. Historical Summary

Date of Construction Start: 17/03/1994
Date of First Criticality: 19/02/1998
Date of Grid Connection: 25/03/1998
Date of Commercial Operation: 07 Jan 1998

Lifetime Generation: 71677.3 GW(e).h
Cumulative Energy Availability Factor: 92.9%
Cumulative Load Factor: 95.0%
Cumulative Unit Capability Factor: 93.0%
Cumulative Energy Unavailability Factor: 7.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1998	2839.3	650	96.1	96.1	96.1	96.1	98.9	98.9	4257	96.4
1999	4696.7	650	80.2	85.6	80.2	85.6	82.5	88.0	7008	80.0
2000	5925.2	650	99.9	91.3	99.9	91.3	103.8	94.3	8784	100.0
2001	4923.9	650	85.3	89.6	85.3	89.6	86.5	92.1	7409	84.6
2002	5043.3	650	91.8	90.1	91.8	90.1	88.6	91.3	8083	92.3
2003	5579.5	650	93.1	90.6	93.1	90.6	98.0	92.5	8176	93.3
2004	5540.3	650	92.5	90.9	92.2	90.9	97.0	93.2	8152	92.8
2005	5997.9	650	100.0	92.1	100.0	92.1	105.3	94.8	8760	100.0
2006	5617.8	682	93.4	92.3	93.4	92.3	94.0	94.7	8205	93.7
2007	5826.6	681	93.8	92.4	93.8	92.4	97.7	95.0	8239	94.1
2008	5761.1	707	92.7	92.5	92.6	92.4	92.8	94.8	8129	92.5
2009	5882.5	707	94.5	92.7	94.3	92.6	95.0	94.8	8287	94.6
2010	5986.4	707	96.3	93.0	96.2	92.9	96.7	95.0	8433	96.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1999 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					23	
C. Inspection, maintenance or repair combined with refuelling				311		
D. Inspection, maintenance or repair without refuelling		327		257		
J. Grid limitation, failure or grid unavailability						1
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	327	0	0	568	23	2
Total		327			593	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1999 to 2010 Average Hours Lost Per Year
16. Steam generation systems		0
21. Fuel Handling and Storage Facilities		3
35. All other I&C Systems		20
Total	0	23

KR-16 WOLSONG-4

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: AECL/DHI (ATOMIC ENERGY OF CANADA LTD./DOOSAN HEAVY INDUSTRY & CONSTRUCTION)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 708.0 MW(e)
 Design Net Capacity: 665.0 MW(e)
 Design Discharge Burnup: 7296 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5831.2 GW(e).h
 Energy Availability Factor: 93.7%
 Load Factor: 94.0%
 Operating Factor: 93.8%
 Energy Unavailability Factor: 6.3%
 Total Off-line Time: 542 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	528.6	477.4	528.5	510.9	529.0	509.9	525.9	527.4	176.3	473.5	512.9	530.7	5831.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	99.9	99.7	99.8	34.5	89.8	100.0	100.0	93.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	34.6	89.9	100.0	100.0	93.8
LF (%)	100.4	100.4	100.3	100.2	100.4	100.0	99.8	100.1	34.6	89.9	100.6	100.7	94.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	34.7	90.3	100.0	100.0	93.8
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	65.5	10.2	0.0	0.0	6.3
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.4	10.2	0.0	0.0	6.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

INSPECTION AND MAINTENANCE(2010.09.11 – 2011.10.03)

5. Historical Summary

Date of Construction Start: 22/07/1994 Lifetime Generation: 66427.2 GW(e).h
 Date of First Criticality: 04 Oct 1999 Cumulative Energy Availability Factor: 93.6%
 Date of Grid Connection: 21/05/1999 Cumulative Load Factor: 96.5%
 Date of Commercial Operation: 10 Jan 1999 Cumulative Unit Capability Factor: 93.7%
 Cumulative Energy Unavailability Factor: 6.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1999	1489.2	650	99.9	99.9	99.9	99.9	103.8	103.8	2208	100.0
2000	5423.3	650	91.4	93.1	91.4	93.1	95.0	96.7	8033	91.5
2001	5493.2	650	92.6	92.9	92.6	92.9	96.5	96.6	8110	92.6
2002	5448.1	650	90.8	92.2	90.8	92.2	95.7	96.3	7971	91.0
2003	5601.9	650	93.5	92.5	93.5	92.5	98.4	96.8	8225	93.9
2004	5620.9	650	93.2	92.6	93.2	92.6	98.4	97.1	8209	93.5
2005	5657.9	650	93.8	92.8	93.8	92.8	99.4	97.5	8254	94.2
2006	6028.3	685	100.0	93.9	100.0	93.9	100.5	97.9	8760	100.0
2007	5770.4	685	92.8	93.7	92.8	93.7	96.2	97.7	8157	93.1
2008	5861.4	708	94.2	93.8	94.1	93.8	94.2	97.3	8271	94.2
2009	5714.1	708	92.7	93.7	92.4	93.6	92.1	96.8	8079	92.2
2010	5831.2	708	93.8	93.7	93.7	93.6	94.0	96.5	8218	93.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010		
	Planned	Unplanned	External	Average Hours Lost Per Year		
				Planned	Unplanned	External
A. Plant equipment problem/failure						4
C. Inspection, maintenance or repair combined with refuelling				177		
D. Inspection, maintenance or repair without refuelling	541			319		
J. Grid limitation, failure or grid unavailability						3
Subtotal	541	0	0	496	4	3
Total		541			503	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		4
31. Turbine and auxiliaries		0
Total	0	4

KR-7 YONGGWANG-1

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 953.0 MW(e)
Design Net Capacity: 938.0 MW(e)
Design Discharge Burnup: 18190 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7791.1 GW(e).h
Energy Availability Factor: 92.4%
Load Factor: 93.3%
Operating Factor: 93.1%
Energy Unavailability Factor: 7.6%
Total Off-line Time: 602 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	719.6	649.5	717.9	694.5	717.2	688.0	704.2	689.3	71.3	715.8	699.4	724.4	7791.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.9	97.2	10.7	100.0	100.0	100.0	92.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	11.0	100.0	100.0	100.0	92.7
LF (%)	101.5	101.4	101.2	101.2	101.2	100.3	99.3	97.2	10.4	101.0	101.9	102.2	93.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	16.4	100.0	100.0	100.0	93.1
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	89.3	0.0	0.0	0.0	7.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	89.0	0.0	0.0	0.0	7.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	0.4	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

REFUELING AND MAINTENANCE(2010-9-3 ~ 9-28)

5. Historical Summary

Date of Construction Start: 06 Apr 1981
Date of First Criticality: 31/01/1986
Date of Grid Connection: 03 May 1986
Date of Commercial Operation: 25/08/1986

Lifetime Generation: 174888.5 GW(e).h
Cumulative Energy Availability Factor: 87.7%
Cumulative Load Factor: 89.7%
Cumulative Unit Capability Factor: 87.8%
Cumulative Energy Unavailability Factor: 12.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	2467.9	900	95.8	95.8	95.6	95.6	74.7	74.7	2928	79.7
1987	5973.9	900	78.8	83.8	78.8	83.7	75.8	75.4	6870	78.4
1988	6199.6	900	77.9	81.4	77.9	81.3	78.4	76.7	6844	77.9
1989	6451.8	900	81.5	81.4	81.5	81.4	81.8	78.2	7136	81.5
1990	6897.5	900	85.7	82.4	85.7	82.3	87.5	80.3	7507	85.7
1991	6695.6	900	84.3	82.7	84.3	82.7	84.9	81.1	7383	84.3
1992	6947.3	900	86.5	83.3	86.5	83.3	87.9	82.2	7600	86.5
1993	6724.0	900	86.8	83.8	86.8	83.8	85.3	82.6	7603	86.8
1994	8230.1	890	99.4	85.6	99.4	85.6	105.6	85.3	8751	99.9
1995	6094.6	900	74.9	84.5	74.9	84.5	77.3	84.5	6781	77.4
1996	6755.5	900	81.4	84.2	81.3	84.2	85.5	84.6	7255	82.6
1997	8236.1	900	99.4	85.5	99.4	85.5	104.5	86.3	8741	99.8
1998	7104.5	900	85.5	85.5	85.5	85.5	90.1	86.6	7599	86.7
1999	6730.0	900	81.1	85.2	81.1	85.2	85.4	86.5	7242	82.7
2000	7215.1	900	87.5	85.3	87.5	85.3	91.3	86.8	7696	87.6
2001	8346.4	900	99.9	86.3	99.9	86.3	105.9	88.1	8760	100.0
2002	7419.0	900	88.8	86.4	88.8	86.4	94.1	88.4	7867	89.8
2003	7074.4	900	86.3	86.4	86.3	86.4	89.7	88.5	7593	86.7
2004	7207.2	900	86.7	86.5	86.7	86.4	91.2	88.7	7688	87.5
2005	8302.9	900	100.0	87.1	100.0	87.1	105.3	89.5	8760	100.0
2006	7545.1	945	91.1	87.3	91.1	87.3	91.1	89.6	8030	91.7
2007	6466.5	942	77.6	86.9	77.3	86.9	78.4	89.1	6855	78.3
2008	8434.7	953	100.0	87.5	99.9	87.5	100.8	89.6	8784	100.0
2009	7414.0	953	89.0	87.6	88.4	87.5	88.8	89.6	7785	88.9
2010	7791.1	953	92.7	87.8	92.4	87.7	93.3	89.7	8158	93.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					59	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	601			908		
D. Inspection, maintenance or repair without refuelling				6		
H. Nuclear regulatory requirements					6	
J. Grid limitation, failure or grid unavailability					0	
Z. Others						1
Subtotal	601	0	0	914	65	1
Total		601			980	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		7
15. Reactor Cooling Systems		2
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		3
41. Main Generator Systems		36
42. Electrical Power Supply Systems		2
XX. Miscellaneous Systems		0
Total	0	56

KR-8 YONGGWANG-2

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 947.0 MW(e)
Design Net Capacity: 938.0 MW(e)
Design Discharge Burnup: 17960 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7461.5 GW(e).h
Energy Availability Factor: 88.9%
Load Factor: 89.9%
Operating Factor: 89.4%
Energy Unavailability Factor: 11.1%
Total Off-line Time: 930 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	715.8	647.7	174.0	303.7	717.1	690.4	707.2	700.1	681.8	711.4	693.8	718.3	7461.5
EAF (%)	100.0	100.0	24.7	43.7	100.0	100.0	100.0	99.4	99.8	99.6	99.9	100.0	88.9
UCF (%)	100.0	100.0	24.9	43.7	100.0	100.0	100.0	100.0	100.0	99.6	99.9	100.0	88.9
LF (%)	101.6	101.8	24.7	44.5	101.8	101.3	100.4	99.4	100.0	101.0	101.8	101.9	89.9
OF (%)	100.0	100.0	27.2	46.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.4
EUf (%)	0.0	0.0	75.3	56.3	0.0	0.0	0.0	0.6	0.2	0.4	0.1	0.0	11.1
PUF (%)	0.0	0.0	75.1	56.3	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	11.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

REFUELING AND MAINTENANCE(2010-3-9 ~ 4-17)

5. Historical Summary

Date of Construction Start: 12 Oct 1981
Date of First Criticality: 15/10/1986
Date of Grid Connection: 11 Nov 1986
Date of Commercial Operation: 06 Oct 1987

Lifetime Generation: 167194.9 GW(e).h
Cumulative Energy Availability Factor: 86.2%
Cumulative Load Factor: 88.2%
Cumulative Unit Capability Factor: 86.3%
Cumulative Energy Unavailability Factor: 13.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	4297.0	900	98.1	98.1	98.1	98.1	97.0	97.0	4826	98.1
1988	6280.9	900	80.6	86.9	80.6	86.9	79.4	85.8	7085	80.7
1989	5703.2	900	73.6	81.7	73.6	81.7	72.3	80.5	6446	73.6
1990	5964.5	900	77.1	80.4	77.1	80.4	75.7	79.2	6757	77.1
1991	6715.0	900	84.9	81.4	84.9	81.4	85.2	80.5	7433	84.9
1992	6434.6	900	82.6	81.6	82.6	81.6	81.4	80.6	7259	82.6
1993	6930.5	900	85.8	82.3	85.7	82.2	87.9	81.7	7506	85.7
1994	7132.9	890	85.5	82.7	85.5	82.7	91.5	83.0	7687	87.8
1995	6036.5	900	74.2	81.7	74.2	81.7	76.6	82.3	6696	76.4
1996	7656.1	900	91.6	82.7	91.6	82.7	96.8	83.8	8189	93.2
1997	6657.3	900	81.2	82.6	81.2	82.6	84.4	83.9	7453	85.1
1998	6010.4	900	74.5	81.9	74.4	81.9	76.2	83.2	6583	75.1
1999	6718.9	900	82.1	81.9	82.1	81.9	85.2	83.4	7301	83.3
2000	7144.1	900	87.1	82.3	87.1	82.3	90.4	83.9	7753	88.3
2001	7169.7	900	87.1	82.6	87.1	82.6	90.9	84.4	7726	88.2
2002	8194.2	900	99.9	83.7	99.6	83.7	103.9	85.6	8744	99.8
2003	7413.3	900	89.7	84.1	89.6	84.1	94.0	86.1	7931	90.5
2004	7242.9	900	87.5	84.3	87.5	84.3	91.6	86.4	7764	88.4
2005	7302.4	900	88.6	84.5	88.6	84.5	92.6	86.8	7881	90.0
2006	8195.7	939	100.0	85.3	99.9	85.3	99.6	87.5	8719	99.5
2007	7030.1	936	85.1	85.3	84.4	85.3	85.7	87.4	7523	85.9
2008	7472.9	947	89.0	85.5	88.9	85.4	89.8	87.5	7850	89.4
2009	8376.9	947	100.0	86.2	99.9	86.1	101.0	88.1	8760	100.0
2010	7461.5	947	88.9	86.3	88.9	86.2	89.9	88.2	7830	89.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				1	41	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	929			945		
D. Inspection, maintenance or repair without refuelling				86		
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						0
Subtotal	929	0	0	1032	45	1
Total		929			1078	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		1
15. Reactor Cooling Systems		2
16. Steam generation systems		7
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		4
35. All other I&C Systems		0
41. Main Generator Systems		16
42. Electrical Power Supply Systems		7
Total	0	39

KR-11 YONGGWANG-3

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKAEC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA ATOMICENERGY RESEARCH IN

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 997.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 42700 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7953.9 GW(e).h
 Energy Availability Factor: 90.7%
 Load Factor: 91.1%
 Operating Factor: 91.5%
 Energy Unavailability Factor: 9.3%
 Total Off-line Time: 746 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	745.2	360.5	256.3	723.3	745.1	717.5	738.2	734.4	715.2	745.5	724.0	748.7	7953.9
EAF (%)	100.0	53.7	34.3	100.0	100.0	99.9	99.3	99.0	99.6	100.0	100.0	100.0	90.7
UCF (%)	100.0	57.2	34.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.1
LF (%)	100.5	53.8	34.6	100.8	100.4	100.0	99.5	99.0	99.6	100.5	100.9	100.9	91.1
OF (%)	100.0	58.3	37.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
EUJ (%)	0.0	46.3	65.7	0.0	0.0	0.1	0.7	1.0	0.4	0.0	0.0	0.0	9.3
PUF (%)	0.0	42.8	65.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	3.5	0.0	0.0	0.0	0.1	0.7	1.0	0.4	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

12TH REFUELING AND MAINTENANCE(2010.2.10-3.20)

5. Historical Summary

Date of Construction Start: 23/12/1989
 Date of First Criticality: 13/10/1994
 Date of Grid Connection: 30/10/1994
 Date of Commercial Operation: 31/03/1995
 Lifetime Generation: 124157.0 GW(e).h
 Cumulative Energy Availability Factor: 90.1%
 Cumulative Load Factor: 91.5%
 Cumulative Unit Capability Factor: 90.2%
 Cumulative Energy Unavailability Factor: 9.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1995	6430.3	950	99.3	99.3	99.3	99.3	92.2	92.2	6573	89.5
1996	6366.2	950	74.0	85.5	74.0	85.5	76.3	83.5	6589	75.0
1997	7229.6	950	84.0	85.0	84.0	85.0	86.9	84.7	7443	85.0
1998	7400.8	950	85.5	85.1	85.5	85.1	88.9	85.8	7566	86.4
1999	7395.3	950	86.7	85.4	86.7	85.4	88.9	86.4	7678	87.6
2000	7262.0	950	85.6	85.5	85.6	85.5	87.0	86.5	7568	86.2
2001	8629.1	950	100.0	87.6	100.0	87.6	103.7	89.0	8760	100.0
2002	7658.2	950	89.1	87.8	89.1	87.8	92.0	89.4	7831	89.4
2003	7818.1	950	90.1	88.0	90.1	88.0	93.9	89.9	7971	91.0
2004	7654.7	950	90.4	88.3	90.3	88.3	91.7	90.1	7801	88.8
2005	8675.6	950	100.0	89.4	100.0	89.4	104.2	91.4	8760	100.0
2006	7556.8	985	87.4	89.2	87.3	89.2	87.6	91.1	7800	89.0
2007	7778.3	987	90.8	89.3	90.2	89.3	90.0	91.0	7916	90.4
2008	7861.9	997	90.2	89.4	90.1	89.3	89.8	90.9	7967	90.7
2009	8737.2	997	100.0	90.1	100.0	90.1	100.0	91.5	8760	100.0
2010	7953.9	997	91.1	90.2	90.7	90.1	91.1	91.5	8014	91.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure						11
B. Refuelling without a maintenance						0
C. Inspection, maintenance or repair combined with refuelling	749			751		
D. Inspection, maintenance or repair without refuelling				7		
E. Testing of plant systems or components						0
Subtotal	749	0	0	758	11	0
Total		749			769	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1995 to 2010 Average Hours Lost Per Year
	12. Reactor I&C Systems	
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		2
35. All other I&C Systems		1
41. Main Generator Systems		0
42. Electrical Power Supply Systems		2
Total	0	9

KR-12 YONGGWANG-4

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKAEC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA ATOMICENERGY RESEARCH IN

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 994.0 MW(e)
 Design Net Capacity: 1049.0 MW(e)
 Design Discharge Burnup: 42700 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8760.6 GW(e).h
 Energy Availability Factor: 99.9%
 Load Factor: 100.6%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.1%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	747.9	675.4	744.9	724.7	747.0	719.9	739.0	735.6	715.2	739.6	723.6	747.7	8760.6
EAF (%)	100.0	100.0	99.6	100.0	100.0	100.0	100.0	99.5	99.9	100.0	100.0	100.0	99.9
UCF (%)	100.0	100.0	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	101.1	101.1	100.7	101.3	101.0	100.6	99.9	99.5	99.9	100.0	101.1	101.1	100.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

TBN RUNBACK ACTUATION DUE TO CPC/CEAC ABNORMAL(2010.3.18)

5. Historical Summary

Date of Construction Start: 26/05/1990 Lifetime Generation: 118809.0 GW(e).h
 Date of First Criticality: 07 Jul 1995 Cumulative Energy Availability Factor: 90.1%
 Date of Grid Connection: 18/07/1995 Cumulative Load Factor: 92.2%
 Date of Commercial Operation: 01 Jan 1996 Cumulative Unit Capability Factor: 90.1%
 Cumulative Energy Unavailability Factor: 9.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1996	7197.5	950	83.5	83.5	83.5	83.5	86.3	86.3	7565	86.1
1997	6767.7	950	78.8	81.1	78.8	81.1	81.3	83.8	7125	81.3
1998	8427.3	950	97.1	86.5	97.1	86.5	101.3	89.6	8591	98.1
1999	7627.9	950	89.0	87.1	89.0	87.1	91.7	90.1	7883	90.0
2000	7252.3	950	84.6	86.6	84.6	86.6	86.9	89.5	7441	84.7
2001	7237.2	950	84.8	86.3	84.8	86.3	87.0	89.1	7424	84.7
2002	7653.5	950	88.7	86.6	88.7	86.6	92.0	89.5	7808	89.1
2003	8576.8	950	98.7	88.1	98.7	88.1	103.1	91.2	8652	98.8
2004	7624.9	950	88.3	88.2	88.3	88.2	91.4	91.2	7782	88.6
2005	7755.0	950	89.8	88.3	89.8	88.3	93.2	91.4	7879	89.9
2006	8646.2	988	100.0	89.4	100.0	89.4	99.9	92.2	8760	100.0
2007	7651.1	987	88.4	89.3	87.8	89.3	88.5	91.9	7790	88.9
2008	7992.6	994	91.4	89.5	91.4	89.5	91.5	91.8	8084	92.0
2009	7694.3	994	88.1	89.4	88.1	89.3	88.4	91.6	7768	88.7
2010	8760.6	994	100.0	90.1	99.9	90.1	100.6	92.2	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1996 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					39	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				769		
Subtotal	0	0	0	769	39	0
Total		0			808	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1996 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		5
14. Safety Systems		7
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		2
41. Main Generator Systems		7
42. Electrical Power Supply Systems		13
Total	0	37

KR-17 YONGGWANG-5

Operator: KHNP (Korea Hydro and Nuclear Power Co.)

Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPANY)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 988.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 13820 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8457.7 GW(e).h
Energy Availability Factor: 97.1%
Load Factor: 97.7%
Operating Factor: 97.4%
Energy Unavailability Factor: 2.9%
Total Off-line Time: 232 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	741.9	670.3	741.9	717.6	741.3	714.5	732.4	728.2	710.7	740.2	718.2	500.5	8457.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.6	99.1	99.9	100.0	100.0	67.6	97.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	67.9	97.3
LF (%)	100.9	101.0	100.9	100.9	100.8	100.4	99.6	99.1	99.9	100.7	101.0	68.1	97.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	68.8	97.4
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.1	0.0	0.0	32.4	2.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.1	2.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.9	0.1	0.0	0.0	0.3	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE SEVENTH REFUELING FROM 2010-12-22 TO 2011-01-15

5. Historical Summary

Date of Construction Start: 29/06/1997 **Lifetime Generation:** 67261.0 GW(e).h
Date of First Criticality: 24/11/2001 **Cumulative Energy Availability Factor:** 87.8%
Date of Grid Connection: 19/12/2001 **Cumulative Load Factor:** 89.4%
Date of Commercial Operation: 21/05/2002 **Cumulative Unit Capability Factor:** 87.9%
 Cumulative Energy Unavailability Factor: 12.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	5006.8	950	98.7	98.7	98.7	98.7	102.6	102.6	5095	99.2
2003	6694.4	950	77.1	85.1	77.1	85.1	80.4	88.6	6856	78.3
2004	5524.5	950	63.3	76.7	63.3	76.7	66.2	79.9	5611	63.9
2005	7748.4	950	89.0	80.1	88.8	80.1	93.1	83.6	7873	89.9
2006	7688.3	987	88.8	82.1	88.8	82.0	88.9	84.8	7859	89.7
2007	8601.7	990	99.1	85.2	99.1	85.2	99.2	87.4	8725	99.6
2008	7807.4	988	90.2	86.0	90.2	85.9	90.0	87.8	7972	90.8
2009	7857.5	988	90.6	86.6	90.6	86.6	90.8	88.2	7987	91.2
2010	8457.7	988	97.3	87.9	97.1	87.8	97.7	89.4	8528	97.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2002 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure						34
C. Inspection, maintenance or repair combined with refuelling	232			864		
D. Inspection, maintenance or repair without refuelling				44		
E. Testing of plant systems or components						3
Subtotal	232	0	0	908	37	0
Total		232			945	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2002 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		9
16. Steam generation systems		20
Total	0	29

KR-18 YONGGWANG-6

Operator: KHNP (Korea Hydro and Nuclear Power Co.)
Contractor: DHICKOPC (DOOSAN HEAVY INDUSTRIES & CONSTRUCTION CO.LTD./KOREA POWER ENGINEERING COMPAN'

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 996.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 13450 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7961.4 GW(e).h
Energy Availability Factor: 91.2%
Load Factor: 91.2%
Operating Factor: 92.0%
Energy Unavailability Factor: 8.8%
Total Off-line Time: 700 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	741.1	669.7	419.7	296.7	743.2	716.0	734.3	731.2	710.4	740.3	718.0	740.9	7961.4
EAF (%)	100.0	100.0	56.6	41.2	100.0	99.8	99.1	98.7	99.1	99.9	100.0	100.0	91.2
UCF (%)	100.0	100.0	56.6	41.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
LF (%)	100.0	100.1	56.6	41.4	100.3	99.8	99.1	98.7	99.1	99.9	100.1	100.0	91.2
OF (%)	100.0	100.0	57.5	46.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.0
EUF (%)	0.0	0.0	43.4	58.8	0.0	0.2	0.9	1.3	0.9	0.1	0.0	0.0	8.8
PUF (%)	0.0	0.0	43.4	58.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.3	0.9	0.1	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE SIXTH REFUELING FROM 2010-03-18 TO 2010-04-16

5. Historical Summary

Date of Construction Start: 20/11/1997
Date of First Criticality: 09 Jan 2002
Date of Grid Connection: 16/09/2002
Date of Commercial Operation: 24/12/2002

Lifetime Generation: 63090.7 GW(e).h
Cumulative Energy Availability Factor: 89.1%
Cumulative Load Factor: 89.3%
Cumulative Unit Capability Factor: 89.3%
Cumulative Energy Unavailability Factor: 10.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2002	524.3	996	100.0	100.0	100.0	100.0	70.7	70.7	543	73.0
2003	7652.2	950	88.2	89.2	88.2	89.2	92.0	90.2	7728	88.2
2004	6354.5	950	72.8	81.3	72.8	81.3	76.1	83.5	6449	73.4
2005	7137.1	950	89.1	83.8	88.8	83.7	85.8	84.2	7906	90.3
2006	7988.6	993	91.5	85.8	91.5	85.7	91.8	86.1	8064	92.1
2007	7859.2	993	90.4	86.7	90.1	86.6	90.3	87.0	7957	90.8
2008	7914.6	996	91.1	87.4	90.9	87.3	90.5	87.6	8073	91.9
2009	8501.4	996	97.9	89.0	97.6	88.8	97.4	89.0	8606	98.2
2010	7961.4	996	91.5	89.3	91.2	89.1	91.2	89.3	8060	92.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2003 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					26	
C. Inspection, maintenance or repair combined with refuelling	700			785		
D. Inspection, maintenance or repair without refuelling				11		
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						0
Subtotal	700	0	0	796	26	0
Total		700			822	

7. Equipment Related Full Outages, Analysis by System

System	2010	2003 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
17. Safety I&C Systems (excluding reactor I&C)		9
41. Main Generator Systems		4
42. Electrical Power Supply Systems		8
Total	0	26

MX-1 LAGUNA VERDE-1

Operator: CFE (COMISION FEDERAL DE ELECTRICIDAD)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 650.0 MW(e)
Design Net Capacity: 654.0 MW(e)
Design Discharge Burnup: 35000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1886.5 GW(e).h
Energy Availability Factor: 41.7%
Load Factor: 33.1%
Operating Factor: 38.7%
Energy Unavailability Factor: 58.3%
Total Off-line Time: 5369 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	494.6	434.4	212.5	0.0	0.0	0.0	0.0	0.0	167.0	154.6	214.2	209.3	1886.5
EAF (%)	99.5	98.3	44.0	0.0	0.0	0.0	0.0	0.7	36.3	34.1	95.2	96.5	41.7
UCF (%)	99.5	98.7	45.6	0.0	0.0	0.0	0.0	0.7	45.3	34.1	95.2	96.6	42.6
LF (%)	102.3	99.4	43.9	0.0	0.0	0.0	0.0	0.0	35.7	32.0	45.8	43.3	33.1
OF (%)	100.0	100.0	46.2	0.0	0.0	0.0	0.0	7.5	72.8	45.4	50.6	46.9	38.7
EUF (%)	0.5	1.7	56.0	100.0	100.0	100.0	100.0	99.3	63.7	65.9	4.8	3.5	58.3
PUF (%)	0.3	0.1	54.2	100.0	59.2	0.0	0.0	7.0	36.2	11.2	4.7	0.1	22.8
UCLF (%)	0.2	1.3	0.3	0.0	40.8	100.0	100.0	92.3	18.5	54.7	0.1	3.4	34.6
XUF (%)	0.0	0.3	1.6	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE LAGUNA VERDE NPP UNIT 1 STARTED THE YEAR OPERATING AT FULL RATED POWER.MARCH 15TH, 2010; 08:27 HOURS. THE 14TH REFUELING STARTED ON MARCH 15TH.MAY 19TH, 2010; 08:27 HRS. HAVE COMPLETED THE SCHEDULED 65 DAYS OF THE 14TH OUTAGE REFUELING.AUGUST 05TH; 2010; 15:25 HRS. AUTOMATIC SCRAM OF THE REACTOR DUE TO FAILURE ON VALVE 1-MS-RV-13A.AUGUST 14TH; 2010; 00:27 HRS. MANUAL SCRAM OF THE REACTOR DUE TO TRIP ON THE BUS 1A AND 1C.AUGUST 24TH, 2010; 16:26 HRS. THE UNIT IS CONNECTED TO THE GRID AND CONCLUDES THE 14TH OUTAGE REFUELING.AUGUST 29TH, 2010; 05:29 HRS. SHUTDOWN OF THE UNIT DUE TO FAILURE ON PRESSURE REGULATOR OF THE ELECTRO HYDRAULIC CONTROL CHANNEL 2.AUGUST 30TH, 2010; 19:50 HRS. AUTOMATIC SCRAM OF THE REACTOR BY TRIP ON MAIN TURBINE DUE TO ACTUATION ON REVELATOR 287/T.SEPTEMBER 05TH; 2010; AUTOMATIC REACTOR SCRAM LOAD SHEDDING SCHEDULE FOR THE MAIN GENERATOR. SEPTEMBER 17TH 2010; 00:48 HOURS. SHUTDOWN OF THE UNIT BY UNUSUAL EVENT DUE TO "KARL" HURRICANESEPTEMBER 21TH 2010; 08:30 HOURS. AUTOMATIC SCRAM OF THE REACTOR DUE TO HIGH-HIGH RADIATION ON MAIN STEAM LINE.OCTOBER 01 TH 2010; 06:46 HOURS. SHUTDOWN OF THE UNIT DUE TO FAILURE ON PRESSURE REGULATOR OF THE ELECTRO HYDRAULIC CONTROL CHANNEL 2.OCTOBER 08TH 2010; 01:03 HOURS. AUTOMATIC SCRAM OF THE REACTOR DUE TO HIGH-HIGH RADIATION ON MAIN STEAM LINE.OCTOBER 18 TH 2010; 13:19 HOURS. SHUTDOWN OF THE UNIT TO REPAIR DESIGN ON CONDENSATE BOOSTER PUMP 1-COND-P-002-D AND SYSTEM AND TURBINE EHC.

5. Historical Summary

Date of Construction Start: 10 Jan 1976 **Lifetime Generation:** 89615.1 GW(e).h
Date of First Criticality: 11 Aug 1988 **Cumulative Energy Availability Factor:** 79.8%
Date of Grid Connection: 13/04/1989 **Cumulative Load Factor:** 76.1%
Date of Commercial Operation: 29/07/1990 **Cumulative Unit Capability Factor:** 80.5%
Cumulative Energy Unavailability Factor: 20.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	2227.9	640	79.7	79.7	79.7	79.7	78.8	78.8	3955	89.6
1991	4062.1	640	74.4	76.2	74.4	76.2	72.5	74.6	7022	80.2
1992	3746.4	654	70.4	73.9	70.4	73.9	65.2	70.8	7024	80.0
1993	4724.4	654	90.6	78.7	90.6	78.7	82.5	74.2	7851	89.6
1994	4062.0	628	77.8	78.5	73.8	77.6	73.8	74.1	7095	81.0
1995	4154.1	628	78.1	78.4	75.5	77.3	75.5	74.3	7128	81.4
1996	3442.3	655	68.8	76.9	68.8	75.9	59.8	72.1	6628	75.5
1997	5218.8	615	96.0	79.4	95.9	78.5	96.9	75.2	8577	97.9
1998	4412.5	655	82.2	79.7	81.7	78.9	76.9	75.4	7359	84.0
1999	4451.0	670	82.8	80.0	81.5	79.1	75.8	75.5	7466	85.2
2000	4577.6	645	80.6	80.1	80.3	79.3	80.8	76.0	7409	84.3
2001	4144.3	645	74.9	79.6	73.2	78.7	73.3	75.8	6808	77.7
2002	4196.3	680	76.4	79.4	75.8	78.5	70.4	75.3	6876	78.5
2003	5415.4	680	97.9	80.8	97.6	80.0	90.9	76.5	8642	98.7
2004	4168.9	680	75.9	80.5	75.2	79.6	69.8	76.0	6818	77.6
2005	5007.8	680	88.8	81.0	88.2	80.2	84.1	76.6	7884	90.0
2006	5529.7	680	97.5	82.1	97.5	81.3	92.8	77.6	8624	98.4
2007	5027.2	680	89.6	82.5	89.4	81.8	84.4	78.0	7963	90.9
2008	3797.8	650	68.4	81.7	67.9	81.0	66.5	77.4	6169	70.2
2009	5454.5	650	95.0	82.4	95.0	81.7	95.8	78.3	8534	97.4
2010	1886.5	650	42.6	80.5	41.7	79.8	33.1	76.1	3391	38.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		599		69	384	
B. Refuelling without a maintenance				32	9	
C. Inspection, maintenance or repair combined with refuelling	1560			659	25	
D. Inspection, maintenance or repair without refuelling				116		
E. Testing of plant systems or components	27			92	6	
J. Grid limitation, failure or grid unavailability			710		7	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	
L. Human factor related		2335				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			63			
Z. Others					24	
Subtotal	1587	2934	773	968	478	0
Total		5294			1446	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		84
13. Reactor Auxiliary Systems		133
14. Safety Systems		7
15. Reactor Cooling Systems		35
17. Safety I&C Systems (excluding reactor I&C)	0	4
31. Turbine and auxiliaries	481	58
32. Feedwater and Main Steam System	101	75
33. Circulating Water System		1
35. All other I&C Systems		29
41. Main Generator Systems	16	
42. Electrical Power Supply Systems	0	18
Total	598	450

MX-2 LAGUNA VERDE-2

Operator: CFE (COMISION FEDERAL DE ELECTRICIDAD)

Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 650.0 MW(e)
Design Net Capacity: 654.0 MW(e)
Design Discharge Burnup: 35000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3705.9 GW(e).h
Energy Availability Factor: 65.4%
Load Factor: 65.1%
Operating Factor: 71.8%
Energy Unavailability Factor: 34.6%
Total Off-line Time: 2471 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	497.4	419.9	478.7	464.3	478.6	459.9	371.4	344.6	191.1	0.0	0.0	0.0	3705.9
EAF (%)	99.8	94.5	97.5	99.4	99.6	99.6	79.0	74.5	43.1	0.0	0.0	0.0	65.4
UCF (%)	99.8	96.0	97.6	99.4	99.6	99.6	79.0	74.6	59.2	0.0	0.0	0.0	66.8
LF (%)	102.9	96.1	99.0	99.2	99.0	98.3	76.8	71.3	40.8	0.0	0.0	0.0	65.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	63.5	0.0	0.0	0.0	71.8
EUf (%)	0.2	5.5	2.5	0.6	0.4	0.4	21.0	25.5	56.9	100.0	100.0	100.0	34.6
PUF (%)	0.2	3.7	0.5	0.5	0.4	0.4	19.0	22.1	23.8	100.0	100.0	85.1	29.9
UCLF (%)	0.0	0.3	1.8	0.1	0.0	0.0	1.9	3.4	17.1	0.0	0.0	14.9	3.3
XUF (%)	0.0	1.5	0.1	0.0	0.0	0.0	0.0	0.0	16.1	0.0	0.0	0.0	1.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE LAGUNA VERDE NPP UNIT 2 STARTED THE YEAR OPERATING AT FULL RATED POWER.JULY 02TH 2010;
08:17 HOURS, DECREASE POWER AT 80% TO EXTEND THE FUEL CYCLE.SEPTEMBER 01TH 2010; 16:08
HOURS, AUTOMATIC SCRAM OF THE UNIT, DURING CHANGE GOVERNMENT VALVE NUMBER 4.SEPTEMBER 17TH
2010; 00:13 HOURS. SHUTDOWN OF THE UNIT BY UNUSUAL EVENT DUE TO "KARL" HURRICANE.SEPTEMBER
28TH, 2010; 09:25 HRS. THE 11TH REFUELING STARTED ON SEPTEMBER 28TH, 2010.DECEMBER 27TH,
2010; 09:25 HRS. HAVE COMPLETED THE SCHEDULED 90 DAYS OF THE 11TH NUCLEAR REFUELING

5. Historical Summary

Date of Construction Start: 06 Jan 1977 **Lifetime Generation:** 72989.2 GW(e).h
Date of First Criticality: 09 Jun 1994 **Cumulative Energy Availability Factor:** 83.3%
Date of Grid Connection: 11 Nov 1994 **Cumulative Load Factor:** 79.7%
Date of Commercial Operation: 04 Oct 1995 **Cumulative Unit Capability Factor:** 84.0%
Cumulative Energy Unavailability Factor: 16.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1995	3379.4	628	85.9	85.9	84.5	84.5	84.5	84.5	5687	89.3
1996	3668.4	619	71.7	77.7	71.0	76.7	67.5	74.7	6657	75.8
1997	4805.5	627	89.0	81.9	88.9	81.2	87.5	79.4	7897	90.1
1998	4411.9	655	85.6	82.9	83.0	81.7	76.9	78.7	7609	86.9
1999	5110.6	668	93.3	85.2	92.3	84.0	87.3	80.6	8459	96.6
2000	3339.1	645	58.6	80.5	56.6	79.2	58.9	76.8	5865	66.8
2001	4228.1	645	74.8	79.6	74.7	78.5	74.8	76.5	6952	79.4
2002	5161.0	680	91.5	81.3	91.5	80.3	86.6	77.9	8273	94.4
2003	4604.8	680	82.5	81.4	82.1	80.5	77.3	77.8	7359	84.0
2004	4578.2	680	83.8	81.7	83.0	80.8	76.6	77.7	7449	84.8
2005	5310.3	680	96.9	83.1	96.5	82.3	89.1	78.8	8611	98.3
2006	4870.2	680	90.3	83.8	90.2	83.0	81.8	79.0	8003	91.4
2007	4920.2	680	90.1	84.3	89.9	83.6	82.6	79.3	8013	91.5
2008	5561.0	650	98.3	85.3	98.3	84.6	97.4	80.6	8730	99.4
2009	4653.7	650	82.4	85.1	81.9	84.4	81.7	80.7	7386	84.3
2010	3705.9	650	66.8	84.0	65.4	83.3	65.1	79.7	6289	71.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		212			173	
B. Refuelling without a maintenance				39	2	
C. Inspection, maintenance or repair combined with refuelling	2160			672		
D. Inspection, maintenance or repair without refuelling				25		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					69	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			107			
Z. Others						5
Subtotal	2160	212	107	736	249	0
Total		2479			985	

7. Equipment Related Full Outages, Analysis by System

System	2010	1995 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		12
12. Reactor I&C Systems		18
13. Reactor Auxiliary Systems		10
14. Safety Systems		2
15. Reactor Cooling Systems		1
16. Steam generation systems		3
21. Fuel Handling and Storage Facilities	110	
31. Turbine and auxiliaries	101	26
32. Feedwater and Main Steam System		28
33. Circulating Water System		9
35. All other I&C Systems		1
41. Main Generator Systems		23
42. Electrical Power Supply Systems		29
Total	211	162

NL-2 BORSSELE

Operator: EPZ (N.V. ELEKTRICITEITS-PRODUKTIEMAATSCHAPPIJ ZUID-NEDERLAND)
 Contractor: S/KWU (SIEMENS/KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 482.0 MW(e)
 Design Net Capacity: 495.0 MW(e)
 Design Discharge Burnup: 39000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3754.9 GW(e).h
 Energy Availability Factor: 88.9%
 Load Factor: 88.9%
 Operating Factor: 89.1%
 Energy Unavailability Factor: 11.1%
 Total Off-line Time: 953 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	321.8	329.0	353.5	20.7	296.2	344.9	349.7	350.2	343.5	358.7	349.8	337.0	3754.9
EAF (%)	88.1	100.0	97.5	5.5	82.0	99.9	100.0	99.7	100.0	100.0	100.0	93.1	88.9
UCF (%)	88.1	100.0	100.0	5.6	82.0	99.9	100.0	99.8	100.0	100.0	100.0	93.2	89.1
LF (%)	89.7	101.6	98.7	6.0	82.6	99.4	97.5	97.7	99.0	99.9	100.8	94.0	88.9
OF (%)	88.4	100.0	100.0	6.7	80.5	100.0	100.0	100.0	100.0	100.0	100.0	93.3	89.1
EUF (%)	11.9	0.0	2.5	94.5	18.0	0.1	0.0	0.3	0.0	0.0	0.0	6.9	11.1
PUF (%)	0.0	0.0	0.0	94.4	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4
UCLF (%)	11.9	0.0	0.0	0.0	11.0	0.1	0.0	0.2	0.0	0.0	0.0	6.9	2.6
XUF (%)	0.0	0.0	2.5	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jan 1969
 Date of First Criticality: 20/06/1973
 Date of Grid Connection: 07 Apr 1973
 Date of Commercial Operation: 26/10/1973
 Lifetime Generation: 123878.0 GW(e).h
 Cumulative Energy Availability Factor: 84.9%
 Cumulative Load Factor: 83.8%
 Cumulative Unit Capability Factor: 85.2%
 Cumulative Energy Unavailability Factor: 15.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1973	485.9	448	49.2	49.2	49.2	49.2	49.2	49.2	49.2	1103	50.0	
1974	2993.7	477	71.6	67.4	71.6	67.4	71.6	67.4	67.4	6840	78.1	
1975	2776.9	447	70.8	68.9	70.8	68.9	70.9	68.9	68.9	6494	74.1	
1976	3274.4	450	82.8	73.1	82.8	73.1	82.8	73.1	73.1	7521	85.6	
1977	3142.4	450	80.4	74.8	80.4	74.8	79.7	74.7	74.7	7318	83.5	
1978	3424.1	445	88.4	77.3	88.4	77.3	87.8	77.1	77.1	7997	91.3	
1979	2900.0	445	83.5	78.3	83.5	78.3	74.4	76.7	76.7	6785	77.5	
1980	3593.0	447	92.9	80.3	92.9	80.3	91.5	78.7	78.7	8496	96.7	
1981	3048.3	447	78.8	80.1	78.8	80.1	77.8	78.6	78.6	7094	81.0	
1982	3315.9	452	83.9	80.5	83.9	80.5	83.7	79.2	79.2	7489	85.5	
1983	3050.0	452	76.9	80.2	76.9	80.2	77.0	79.0	79.0	6959	79.4	
1984	3062.0	452	76.6	79.8	76.6	79.8	77.1	78.8	78.8	6895	78.5	
1985	3261.2	452	83.3	80.1	81.9	80.0	82.4	79.1	79.1	7299	83.3	
1986	3574.0	452	91.6	81.0	89.9	80.8	90.3	79.9	79.9	8053	91.9	
1987	2950.9	452	76.6	80.7	74.2	80.3	74.5	79.6	79.6	6756	77.1	
1988	3032.6	452	76.2	80.4	76.2	80.0	76.4	79.3	79.3	6763	77.0	
1989	3421.9	481	87.8	80.9	87.8	80.5	81.2	79.5	79.5	7711	88.0	
1990	2885.9	481	75.6	80.6	75.6	80.2	68.5	78.8	78.8	6636	75.8	
1991	2728.5	452	69.3	79.9	69.2	79.6	68.9	78.3	78.3	6221	71.0	
1992	2830.3	452	82.9	80.1	80.6	79.7	71.3	77.9	77.9	6412	73.0	
1993	3328.2	452	84.3	80.3	83.6	79.9	84.1	78.2	78.2	7376	84.2	
1994	3322.0	452	84.8	80.5	84.1	80.1	83.9	78.5	78.5	7489	85.5	
1995	3386.8	452	87.1	80.8	86.8	80.4	85.5	78.8	78.8	7654	87.4	
1996	3520.3	452	88.3	81.1	88.2	80.7	88.7	79.2	79.2	7978	90.8	
1997			Data not provided									
1998			"									
1999	3604.2	449	94.2	81.7	94.2	81.3	91.6	79.7	79.7	8363	95.5	
2000	3699.0	449	93.9	82.1	93.1	81.7	93.8	80.3	80.3	8262	94.1	
2001	3746.7	449	94.6	82.6	94.6	82.2	95.3	80.8	80.8	8404	95.9	
2002	3686.9	450	93.8	83.0	93.4	82.6	93.5	81.3	81.3	8284	94.6	
2003	3788.3	450	95.3	83.4	95.3	83.1	96.1	81.8	81.8	8431	96.2	
2004	3604.7	450	91.1	83.7	91.1	83.3	91.2	82.1	82.1	8073	91.9	
2005	3771.9	450	95.9	84.1	95.5	83.7	95.7	82.6	82.6	8430	96.2	
2006	3272.6	450	85.7	84.2	84.6	83.8	82.5	82.6	82.6	7542	86.1	
2007	3993.9	482	95.2	84.5	95.1	84.1	94.6	83.0	83.0	8346	95.3	
2008	3933.6	482	92.6	84.8	92.6	84.4	92.9	83.3	83.3	8161	92.9	
2009	4017.7	487	95.1	85.1	95.1	84.7	95.5	83.7	83.7	8352	95.3	
2010	3754.9	482	89.1	85.2	88.9	84.9	88.9	83.8	83.8	7807	89.1	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		230			142	
B. Refuelling without a maintenance				28	1	
C. Inspection, maintenance or repair combined with refuelling	723			700	16	
D. Inspection, maintenance or repair without refuelling				45		
E. Testing of plant systems or components					19	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				27		
J. Grid limitation, failure or grid unavailability					1	2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	3	4
Subtotal	723	230	0	800	182	6
Total		953			988	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		3
14. Safety Systems		13
15. Reactor Cooling Systems		17
16. Steam generation systems		36
31. Turbine and auxiliaries		17
32. Feedwater and Main Steam System		29
33. Circulating Water System		2
41. Main Generator Systems		0
42. Electrical Power Supply Systems	136	10
XX. Miscellaneous Systems	94	7
Total	230	138

PK-2 CHASNUPP 1

Operator: PAEC (PAKISTAN ATOMIC ENERGY COMMISSION)
Contractor: CNNC (CHINA NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 300.0 MW(e)
Design Net Capacity: 300.0 MW(e)
Design Discharge Burnup: 30000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2095.8 GW(e).h
Energy Availability Factor: 80.7%
Load Factor: 79.7%
Operating Factor: 81.7%
Energy Unavailability Factor: 19.3%
Total Off-line Time: 1600 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	220.2	202.4	223.3	71.9	0.0	105.8	211.8	215.0	194.8	215.4	216.1	219.1	2095.8
EAF (%)	98.5	100.0	100.0	33.6	0.0	49.1	95.6	100.0	93.7	100.0	100.0	98.0	80.7
UCF (%)	98.5	100.0	100.0	33.6	0.0	49.1	95.6	100.0	93.7	100.0	100.0	98.0	80.7
LF (%)	98.7	100.4	100.0	33.3	0.0	49.0	94.9	96.3	90.2	96.5	100.0	98.2	79.7
OF (%)	100.0	100.0	100.0	34.0	0.0	54.4	96.1	100.0	96.7	100.0	100.0	100.0	81.7
EUf (%)	1.5	0.0	0.0	66.4	100.0	50.9	4.4	0.0	6.3	0.0	0.0	2.0	19.3
PUF (%)	1.5	0.0	0.0	66.0	100.0	48.8	0.0	0.0	1.8	0.0	0.0	2.0	18.4
UCLF (%)	0.0	0.0	0.0	0.5	0.0	2.2	4.4	0.0	4.5	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

PLANT REMAINED SHUTDOWN FOR ABOUT TWO MONTHS FOR ITS 6TH REFUELING OUTAGE FROM 11 APRIL TO 14 JUNE. PLANT FACED TWO AUTO TRIPS DURING THE REPORTING PERIOD.

5. Historical Summary

Date of Construction Start: 08 Jan 1993
Date of First Criticality: 05 Mar 2000
Date of Grid Connection: 13/06/2000
Date of Commercial Operation: 15/09/2000

Lifetime Generation: 19460.0 GW(e).h
Cumulative Energy Availability Factor: 71.9%
Cumulative Load Factor: 71.2%
Cumulative Unit Capability Factor: 72.5%
Cumulative Energy Unavailability Factor: 28.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	529.2	300	72.2	72.2	72.2	72.2	68.7	68.7	1860	72.4
2001	1581.8	300	62.4	64.7	60.1	62.8	60.2	62.1	5918	67.6
2002	1356.0	300	53.7	59.9	52.2	58.2	51.6	57.5	4790	54.7
2003	1809.8	300	68.9	62.6	68.9	61.4	68.9	61.0	6879	78.5
2004	1750.7	300	68.1	63.9	66.4	62.6	66.4	62.2	5949	67.7
2005	2155.2	300	81.9	67.3	81.9	66.2	82.0	66.0	7458	85.1
2006	2532.9	300	98.2	72.2	98.2	71.3	96.4	70.8	8569	97.8
2007	1949.1	300	75.6	72.7	75.2	71.8	74.2	71.3	6669	76.1
2008	1356.5	300	52.4	70.2	52.3	69.5	51.5	68.9	4795	54.6
2009	2145.9	300	82.8	71.6	82.8	70.9	81.7	70.3	7379	84.2
2010	2095.8	300	80.7	72.5	80.7	71.9	79.7	71.2	7160	81.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		83			651	
C. Inspection, maintenance or repair combined with refuelling	1528			943	12	
D. Inspection, maintenance or repair without refuelling				74		
E. Testing of plant systems or components				6	2	
H. Nuclear regulatory requirements				49		
J. Grid limitation, failure or grid unavailability					5	130
L. Human factor related					10	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						28
Z. Others					42	
Subtotal	1528	83	0	1072	722	158
Total		1611			1952	

7. Equipment Related Full Outages, Analysis by System

System	2010	2000 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		43
12. Reactor I&C Systems		21
14. Safety Systems		76
15. Reactor Cooling Systems	35	202
16. Steam generation systems		2
21. Fuel Handling and Storage Facilities	15	
31. Turbine and auxiliaries		65
32. Feedwater and Main Steam System	32	40
33. Circulating Water System		14
35. All other I&C Systems		4
41. Main Generator Systems		2
42. Electrical Power Supply Systems		176
Total	82	645

PK-1 KANUPP

Operator: PAEC (PAKISTAN ATOMIC ENERGY COMMISSION)
Contractor: CGE (CANADIAN GENERAL ELECTRIC)

1. Station Details

Type: PHWR
Net Reference Unit Power (RUF at the beginning of 2010): 125.0 MW(e)
Design Net Capacity: 125.0 MW(e)
Design Discharge Burnup: 8650 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 464.6 GW(e).h
Energy Availability Factor: 43.3%
Load Factor: 42.4%
Operating Factor: 69.2%
Energy Unavailability Factor: 56.7%
Total Off-line Time: 2697 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	32.2	53.3	42.5	56.5	54.7	48.9	9.8	44.6	53.6	37.0	31.5	0.0	464.6
EAF (%)	34.7	63.4	56.5	62.7	58.9	54.3	10.5	48.0	59.5	39.8	35.0	0.0	43.3
UCF (%)	34.7	63.4	56.5	62.7	58.9	54.3	10.5	48.0	59.5	39.8	35.0	0.0	43.3
LF (%)	34.7	63.4	45.7	62.7	58.9	54.3	10.5	48.0	59.5	39.8	35.0	0.0	42.4
OF (%)	55.2	100.0	72.8	100.0	100.0	100.0	19.6	76.5	93.9	59.8	58.1	0.0	69.2
EUF (%)	65.3	36.6	43.5	37.3	41.1	45.7	89.5	52.0	40.5	60.2	65.0	100.0	56.7
PUF (%)	20.6	36.6	27.2	37.3	41.1	45.7	89.5	28.5	34.4	20.1	23.0	54.8	38.3
UCLF (%)	44.7	0.0	16.3	0.0	0.0	0.0	0.0	23.5	6.1	40.2	42.0	45.2	18.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

KANUPP OPERATED AT LOAD OF 80-90 MWE DURING REPORTING PERIOD AND GENERATED 464.57 GWH ELECTRICITY.

5. Historical Summary

Date of Construction Start: 08 Jan 1966
Date of First Criticality: 08 Jan 1971
Date of Grid Connection: 18/10/1971
Date of Commercial Operation: 12 Jul 1972

Lifetime Generation: 11691.0 GW(e).h
Cumulative Energy Availability Factor: 30.0%
Cumulative Load Factor: 27.9%
Cumulative Unit Capability Factor: 31.0%
Cumulative Energy Unavailability Factor: 70.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1972	39.4	137	38.7	38.7	38.7	38.7	38.7	38.7	38.7	597	80.2
1973	394.8	126	42.6	42.2	35.6	35.9	35.8	36.0	6197	70.7	
1974	583.9	126	52.7	47.3	52.7	43.9	52.9	44.1	6749	77.0	
1975	494.9	126	44.8	46.5	44.8	44.2	44.8	44.3	6375	72.8	
1976	487.3	137	40.5	44.9	40.5	43.3	40.5	43.3	6026	68.6	
1977	339.4	126	30.7	42.2	30.7	40.8	30.7	40.9	5290	60.4	
1978	228.4	125	20.9	38.8	20.9	37.6	20.9	37.7	4473	51.1	
1979	29.6	125	2.7	33.8	2.7	32.8	2.7	32.8	802	9.2	
1980	67.9	125	6.2	30.4	6.2	29.6	6.2	29.6	2427	27.6	
1981	192.2	125	17.5	29.0	17.5	28.3	17.6	28.3	5379	61.4	
1982	70.9	125	6.5	26.8	6.5	26.1	6.5	26.2	1801	20.6	
1983	194.0	125	17.7	26.0	17.7	25.4	17.7	25.4	4754	54.3	
1984	290.7	137	26.9	26.1	24.9	25.3	24.2	25.3	5592	63.7	
1985	262.0	137	22.7	25.8	21.8	25.0	21.8	25.0	3895	44.5	
1986	476.2	125	44.0	27.1	43.5	26.3	43.5	26.3	7211	82.3	
1987	274.8	125	25.6	27.0	25.1	26.2	25.1	26.2	4541	51.8	
1988	171.4	125	16.2	26.3	15.6	25.6	15.6	25.6	2962	33.7	
1989	60.9	125	5.6	25.1	5.6	24.4	5.6	24.4	1145	13.1	
1990	375.9	125	34.3	25.6	34.3	25.0	34.3	25.0	5331	60.9	
1991	370.3	125	34.8	26.1	33.8	25.4	33.8	25.4	6126	69.9	
1992	499.7	125	45.5	27.0	45.5	26.4	45.5	26.4	6396	72.8	
1993	369.6	125	35.8	27.5	33.8	26.8	33.8	26.7	4620	52.7	
1994	523.6	125	53.6	28.6	47.8	27.7	47.8	27.7	7518	85.8	
1995	461.0	125	44.0	29.3	42.1	28.3	42.1	28.3	7520	85.8	
1996	310.9	125	32.6	29.4	28.3	28.3	28.3	28.3	5291	60.2	
1997	386.1	125	36.8	29.7	35.3	28.6	35.3	28.6	6391	73.0	
1998	353.4	125	31.3	29.8	29.7	28.6	32.3	28.7	4799	54.8	
1999	69.0	125	11.9	29.1	11.9	28.0	6.3	27.9	1046	11.9	
2000	368.3	125	34.6	29.3	33.5	28.2	33.5	28.1	5078	57.8	
2001	399.5	125	45.1	29.8	36.5	28.5	36.5	28.4	6049	69.1	
2002	444.0	125	41.3	30.2	40.5	28.9	40.5	28.8	6601	75.4	
2003	0.0	125	0.0	29.3	0.0	28.0	0.0	27.9	0	0.0	
2004	183.0	125	25.5	29.1	24.7	27.9	16.7	27.5	6467	73.6	
2005	253.6	125	37.7	29.4	37.7	28.2	23.2	27.4	6633	75.7	
2006	15.0	125	4.6	28.7	4.6	27.5	1.4	26.6	408	4.7	
2007	359.5	125	50.9	29.3	50.9	28.1	32.8	26.8	5989	68.4	
2008	384.8	125	63.4	30.2	63.4	29.1	35.0	27.0	5026	57.2	
2009	491.3	125	47.8	30.7	47.8	29.6	44.9	27.5	6282	71.7	
2010	464.6	125	43.3	31.0	43.3	30.0	42.4	27.9	6063	69.2	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1489			1094	
B. Refuelling without a maintenance					58	
C. Inspection, maintenance or repair combined with refuelling				201		
D. Inspection, maintenance or repair without refuelling	1006			1486		
E. Testing of plant systems or components				0		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				271		
J. Grid limitation, failure or grid unavailability			81			232
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				3	96	11
L. Human factor related		120				
Subtotal	1006	1609	81	1961	1248	243
Total		2696			3452	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		16
12. Reactor I&C Systems	373	109
13. Reactor Auxiliary Systems	190	113
14. Safety Systems		16
15. Reactor Cooling Systems		179
16. Steam generation systems	638	77
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities	44	38
31. Turbine and auxiliaries	244	31
32. Feedwater and Main Steam System		178
33. Circulating Water System		29
41. Main Generator Systems		5
42. Electrical Power Supply Systems		122
XX. Miscellaneous Systems		4
Total	1489	917

RO-1 CERNAVODA-1

Operator: SNN (SOCIETATEA NATIONALA NUCLEARELECTRICA S.A.)
 Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 650.0 MW(e)
 Design Net Capacity: 650.0 MW(e)
 Design Discharge Burnup: 7100 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5167.2 GW(e).h
 Energy Availability Factor: 90.2%
 Load Factor: 90.7%
 Operating Factor: 91.1%
 Energy Unavailability Factor: 9.8%
 Total Off-line Time: 778 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	439.4	434.2	487.5	435.2	109.8	435.0	434.4	473.6	468.9	489.5	473.2	486.6	5167.2
EAF (%)	90.4	99.0	99.9	91.8	22.3	92.7	89.9	97.9	99.8	99.9	99.9	99.9	90.2
UCF (%)	90.4	99.0	99.9	93.0	22.3	92.7	91.2	99.7	99.9	99.9	99.9	99.9	90.5
LF (%)	90.9	99.4	100.9	93.0	22.7	92.9	89.8	97.9	100.2	101.1	101.1	100.6	90.7
OF (%)	92.5	99.9	100.0	93.5	22.6	93.9	92.7	100.0	100.0	100.0	100.0	100.0	91.1
EUF (%)	9.6	1.0	0.1	8.2	77.7	7.3	10.1	2.1	0.2	0.1	0.1	0.1	9.8
PUF (%)	0.1	0.1	0.1	0.0	77.7	7.3	0.4	0.3	0.1	0.1	0.1	0.1	7.3
UCLF (%)	9.6	0.9	0.0	6.9	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	2.2
XUF (%)	0.0	0.0	0.0	1.2	0.0	0.0	1.2	1.8	0.0	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE UNIT WAS OPERATED AT FULL POWER IN BASE LOAD MODE. THE ANNUAL PLANNED OUTAGE TOOK PLACE BETWEEN MAY 8- JUN 2ND 2010: PLANNED OUTAGE. MAIN ACTIVITIES WERE: PHT PUMPS 1-3312-PM02 MOTOR REPLACEMENT AND SEAL REPLACEMENT FOR 1-33120-P2 AND 1-33120-P4; INTERNAL COMPONENTS REPLACEMENT AT 1-63332-PCV24/PCV25; ECT INSPECTION ON BOILER 1-3311-GA#2; REFURBISHMENT OF STATION COMPUTERS DCC-X AND DCC-Y; INSPECTIONS ON TURBINE-GENERATOR; PREVENTIVE MAINTENANCE ELECTRICAL SYSTEMS. DURING 2010 U1 HAD 5 UNPLANNED OUTAGES DUE TO EQUIPMENT PROBLEMS (SEE OUTAGES).

5. Historical Summary

Date of Construction Start: 07 Jan 1982
 Date of First Criticality: 16/04/1996
 Date of Grid Connection: 07 Nov 1996
 Date of Commercial Operation: 12 Feb 1996

Lifetime Generation: 72225.8 GW(e).h
 Cumulative Energy Availability Factor: 88.3%
 Cumulative Load Factor: 88.6%
 Cumulative Unit Capability Factor: 89.3%
 Cumulative Energy Unavailability Factor: 11.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1996	461.9	647	94.4	94.4	94.4	94.4	99.6	99.6	719	100.0
1997	4953.3	646	87.3	87.9	86.7	87.3	87.5	88.4	7753	88.5
1998	4908.7	655	85.8	86.9	85.2	86.3	85.5	87.0	7585	86.6
1999	4813.0	654	83.8	85.9	83.5	85.4	83.9	86.0	7389	84.3
2000	5053.4	655	87.9	86.4	87.6	85.9	87.8	86.5	7791	88.7
2001	5049.9	655	88.2	86.7	87.5	86.2	88.0	86.8	7717	88.1
2002	5106.2	655	89.1	87.1	88.7	86.6	89.0	87.1	7854	89.7
2003	4541.4	655	86.7	87.1	78.7	85.5	79.1	86.0	7024	80.2
2004	5142.3	655	89.4	87.3	89.1	86.0	89.4	86.4	7892	89.8
2005	5113.0	655	89.6	87.6	89.3	86.3	89.1	86.7	7878	89.9
2006	5178.0	655	90.8	87.9	90.3	86.7	90.2	87.1	7987	91.2
2007	5518.3	655	97.1	88.7	96.5	87.6	96.2	87.9	8527	97.3
2008	4805.5	650	84.6	88.4	83.8	87.3	84.2	87.6	7411	84.4
2009	5661.7	650	99.2	89.2	98.9	88.2	99.4	88.5	8709	99.4
2010	5167.2	650	90.5	89.3	90.2	88.3	90.7	88.6	7982	91.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1997 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		153			218	
B. Refuelling without a maintenance					8	
D. Inspection, maintenance or repair without refuelling	620			574		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					17	3
L. Human factor related		4			10	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						48
Subtotal	620	157	0	574	253	51
Total		777			878	

7. Equipment Related Full Outages, Analysis by System

System	2010	1997 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	54	49
13. Reactor Auxiliary Systems		13
14. Safety Systems		2
15. Reactor Cooling Systems	1	
31. Turbine and auxiliaries	51	56
32. Feedwater and Main Steam System		22
33. Circulating Water System		0
41. Main Generator Systems		26
42. Electrical Power Supply Systems	47	7
XX. Miscellaneous Systems		25
Total	153	200

RO-2 CERNAVOVA-2

Operator: SNN (SOCIETATEA NATIONALA NUCLEARELECTRICA S.A.)
 Contractor: AECL (ATOMIC ENERGY OF CANADA LTD.)

1. Station Details

Type: PHWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 650.0 MW(e)
 Design Net Capacity: 650.0 MW(e)
 Design Discharge Burnup: 7100 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5537.5 GW(e).h
 Energy Availability Factor: 96.9%
 Load Factor: 97.3%
 Operating Factor: 97.6%
 Energy Unavailability Factor: 3.1%
 Total Off-line Time: 209 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	482.9	423.4	420.5	471.9	483.1	464.5	408.8	470.0	465.0	487.3	472.2	488.0	5537.5
EAF (%)	99.7	96.7	86.5	99.9	99.7	99.4	84.8	97.3	99.5	99.9	99.9	99.9	96.9
UCF (%)	99.7	96.7	86.5	100.0	99.7	99.8	86.4	99.9	99.9	99.9	99.9	99.9	97.3
LF (%)	99.8	96.9	87.1	100.8	99.9	99.2	84.5	97.2	99.4	100.6	100.9	100.9	97.3
OF (%)	100.0	96.9	87.3	100.0	100.0	100.0	87.4	100.0	100.0	100.0	100.0	100.0	97.6
EUf (%)	0.3	3.3	13.5	0.1	0.3	0.6	15.2	2.7	0.5	0.1	0.1	0.1	3.1
PUF (%)	0.3	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
UCLF (%)	0.0	3.2	13.4	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0	0.0	2.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	1.6	2.6	0.4	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NO ANNUAL OUTAGE WAS PLANNED FOR THIS YEAR, THE UNIT WAS OPERATED AT FULL POWER IN BASE LOAD MODE, WITH THE FOLLOWING EXCEPTIONS: 2 UNPLANNED OUTAGES (ONE WITH EQUIPMENT PROBLEM AND ONE WITH HUMAN ERROR-SEE OUTAGES).

5. Historical Summary

Date of Construction Start: 07 Jan 1983
 Date of First Criticality: 05 Jun 2007
 Date of Grid Connection: 08 Jul 2007
 Date of Commercial Operation: 31/10/2007

Lifetime Generation: 17784.1 GW(e).h
 Cumulative Energy Availability Factor: 94.8%
 Cumulative Load Factor: 93.9%
 Cumulative Unit Capability Factor: 95.7%
 Cumulative Energy Unavailability Factor: 5.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2007	1182.8	650	95.4	95.4	95.4	95.4	82.4	82.4	1846	83.6
2008	5528.1	650	98.6	98.0	96.9	96.6	96.8	93.9	8669	98.7
2009	5158.2	650	91.3	95.0	90.6	93.9	90.6	92.4	8044	91.8
2010	5537.5	650	97.3	95.7	96.9	94.8	97.3	93.9	8551	97.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2007 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		114			69	
D. Inspection, maintenance or repair without refuelling				141		
J. Grid limitation, failure or grid unavailability						0
L. Human factor related		93				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						17
Subtotal	0	207	0	141	69	17
Total		207			227	

7. Equipment Related Full Outages, Analysis by System

System	2010	2007 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
15. Reactor Cooling Systems	114	
31. Turbine and auxiliaries		24
41. Main Generator Systems		24
42. Electrical Power Supply Systems		10
Total	114	68

RU-96 BALAKOVO-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6843.3 GW(e).h
Energy Availability Factor: 80.3%
Load Factor: 82.2%
Operating Factor: 80.7%
Energy Unavailability Factor: 19.7%
Total Off-line Time: 1691 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	229.7	0.0	158.6	718.9	750.0	718.2	653.2	717.8	705.4	737.4	713.9	740.2	6843.3
EAF (%)	33.1	0.0	26.1	99.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.3
UCF (%)	34.5	0.0	26.1	99.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.4
LF (%)	32.5	0.0	22.5	105.1	106.1	105.0	92.4	101.6	103.1	104.2	104.4	104.7	82.2
OF (%)	35.8	0.0	27.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.7
EUf (%)	66.9	100.0	73.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.7
PUf (%)	65.5	89.3	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
UCLF (%)	0.0	10.7	73.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
XUF (%)	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN MARCH - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 187537 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.01.12 TO 10.02.25. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 12 Jan 1980 **Lifetime Generation:** 137213.0 GW(e).h
Date of First Criticality: 12 Dec 1985 **Cumulative Energy Availability Factor:** 68.7%
Date of Grid Connection: 28/12/1985 **Cumulative Load Factor:** 66.2%
Date of Commercial Operation: 23/05/1986 **Cumulative Unit Capability Factor:** 71.2%
Cumulative Energy Unavailability Factor: 31.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	3675.6	950	66.3	66.3	66.3	66.3	65.8	65.8	4171	70.9
1987	4703.7	1000	57.4	60.8	57.4	60.8	53.7	58.4	5302	60.5
1988	6476.9	950	80.9	68.2	80.9	68.2	77.6	65.5	7207	82.0
1989	4473.9	950	56.4	65.0	56.3	65.0	53.8	62.3	5141	58.7
1990	739.1	950	9.1	53.2	9.1	53.2	8.9	51.0	887	10.1
1991	4951.6	950	60.2	54.4	59.8	54.4	59.5	52.5	5780	66.0
1992	6352.3	950	76.4	57.7	76.3	57.6	76.1	56.0	7666	87.3
1993	3326.1	950	46.1	56.2	39.9	55.3	40.0	53.9	4230	48.3
1994	1759.5	950	77.3	58.6	77.3	57.9	21.1	50.2	2307	26.3
1995	2018.0	950	28.6	55.5	28.6	54.8	24.2	47.5	4810	54.9
1996	4872.5	950	86.5	58.4	59.0	55.2	58.4	48.5	5913	67.3
1997	4729.0	950	60.4	58.6	57.2	55.4	56.8	49.2	5818	66.4
1998	4329.8	950	55.8	58.4	52.2	55.1	52.0	49.5	5671	64.7
1999	5141.3	950	65.6	58.9	62.1	55.7	61.8	50.4	6337	72.3
2000	7247.4	950	87.5	60.8	86.5	57.8	86.8	52.8	7705	87.7
2001	7407.9	950	91.6	62.8	88.2	59.7	89.0	55.1	8041	91.8
2002	6785.7	950	86.5	64.2	80.5	60.9	81.5	56.7	7501	85.6
2003	7032.2	950	84.7	65.4	83.1	62.2	84.5	58.3	7460	85.2
2004	6626.4	950	78.2	66.1	78.0	63.0	79.4	59.4	6901	78.6
2005	7312.7	950	86.6	67.1	86.2	64.2	87.9	60.9	7638	87.2
2006	7277.0	950	85.5	68.0	85.2	65.2	87.4	62.1	7517	85.8
2007	7397.3	950	88.0	68.9	86.5	66.2	88.9	63.4	7731	88.3
2008	6810.2	950	82.4	69.5	81.7	66.9	81.6	64.2	7283	82.9
2009	7948.5	950	99.7	70.8	99.6	68.3	95.5	65.5	8760	100.0
2010	6843.3	950	80.4	71.2	80.3	68.7	82.2	66.2	7069	80.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		612			397	
B. Refuelling without a maintenance					10	
C. Inspection, maintenance or repair combined with refuelling	1078			1265	15	
D. Inspection, maintenance or repair without refuelling				366		
E. Testing of plant systems or components				1	1	
G. Major back-fitting, refurbishment or upgrading activities without refuelling						97
J. Grid limitation, failure or grid unavailability						192
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					31	1
L. Human factor related					0	
Subtotal	1078	612	0	1632	454	290
Total		1690			2376	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		2
15. Reactor Cooling Systems		10
16. Steam generation systems	612	111
17. Safety I&C Systems (excluding reactor I&C)		4
31. Turbine and auxiliaries		60
32. Feedwater and Main Steam System		13
33. Circulating Water System		1
35. All other I&C Systems		10
41. Main Generator Systems		117
42. Electrical Power Supply Systems		27
XX. Miscellaneous Systems		2
Total	612	359

RU-97 BALAKOVO-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUF)
at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8683.9 GW(e).h
Energy Availability Factor: 99.9%
Load Factor: 104.3%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.1%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	748.8	689.5	762.8	731.1	723.3	707.9	631.0	720.2	721.0	763.5	736.7	747.8	8683.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.6	99.3	100.0	100.0	100.0	99.5	99.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	105.9	108.0	108.1	106.9	102.3	103.5	89.3	101.9	105.4	107.9	107.7	105.8	104.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.5	0.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.0	0.5	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 384501 MWH. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 08 Jan 1981 **Lifetime Generation:** 129531.0 GW(e).h
Date of First Criticality: 10 Feb 1987 **Cumulative Energy Availability Factor:** 67.9%
Date of Grid Connection: 10 Aug 1987 **Cumulative Load Factor:** 67.1%
Date of Commercial Operation: 18/01/1988 **Cumulative Unit Capability Factor:** 71.2%
Cumulative Energy Unavailability Factor: 32.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	5978.4	950	76.9	76.9	76.9	76.9	71.6	71.6	6928	78.9
1989	6703.6	950	84.8	80.9	84.8	80.8	80.6	76.1	7626	87.1
1990	5476.7	950	66.5	76.1	66.3	76.0	65.8	72.7	6165	70.4
1991	4308.4	950	51.5	69.9	51.2	69.8	51.8	67.4	4845	55.3
1992	5958.2	950	70.6	70.1	70.6	70.0	71.4	68.2	6601	75.1
1993	3776.2	950	47.0	66.2	44.3	65.7	45.4	64.4	4147	47.3
1994	4778.5	950	83.5	68.7	73.1	66.7	57.4	63.4	8020	91.6
1995	2204.8	950	30.1	63.9	30.1	62.2	26.5	58.8	3261	37.2
1996	2227.3	950	26.7	59.7	26.7	58.2	26.7	55.2	2604	29.6
1997	4015.9	950	63.9	60.2	55.7	58.0	48.3	54.5	6158	70.3
1998	3293.8	950	51.0	59.3	40.2	56.4	39.6	53.2	4984	56.9
1999	2927.1	950	40.3	57.7	35.4	54.6	35.2	51.7	3942	45.0
2000	5730.1	950	83.2	59.7	68.9	55.7	68.7	53.0	7646	87.0
2001	6678.8	950	83.9	61.4	79.9	57.4	80.3	54.9	7415	84.6
2002	6756.5	950	84.4	63.0	80.4	59.0	81.2	56.7	7408	84.6
2003	6171.8	950	74.0	63.7	72.7	59.8	74.2	57.8	6467	73.8
2004	7010.4	950	85.0	64.9	82.4	61.2	84.0	59.3	7514	85.5
2005	6948.9	950	86.9	66.1	82.5	62.3	83.5	60.7	7688	87.8
2006	7237.5	950	87.4	67.2	84.6	63.5	87.0	62.0	7710	88.0
2007	6657.2	950	83.5	68.1	78.7	64.3	80.0	62.9	7327	83.6
2008	7451.2	950	87.8	69.0	87.7	65.4	89.3	64.2	7750	88.2
2009	7630.7	950	88.8	69.9	88.6	66.4	91.7	65.5	7797	89.0
2010	8683.9	950	100.0	71.2	99.9	67.9	104.3	67.1	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					420	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling				1592	118	
D. Inspection, maintenance or repair without refuelling				129		
J. Grid limitation, failure or grid unavailability						9
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					19	
Subtotal	0	0	0	1721	561	9
Total		0			2291	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		9
15. Reactor Cooling Systems		9
16. Steam generation systems		347
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		22
35. All other I&C Systems		3
41. Main Generator Systems		22
42. Electrical Power Supply Systems		1
Total	0	416

RU-98 BALAKOVO-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7649.6 GW(e).h
 Energy Availability Factor: 87.1%
 Load Factor: 91.9%
 Operating Factor: 88.0%
 Energy Unavailability Factor: 12.9%
 Total Off-line Time: 1050 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	750.1	690.1	755.5	732.8	731.0	710.5	665.6	0.0	380.3	753.8	726.6	753.4	7649.6
EAF (%)	100.0	100.0	99.3	100.0	100.0	100.0	92.6	0.1	55.0	100.0	100.0	100.0	87.1
UCF (%)	100.0	100.0	99.3	100.0	100.0	100.0	100.0	0.1	55.0	100.0	100.0	100.0	87.8
LF (%)	106.1	108.1	107.0	107.1	103.4	103.9	94.2	0.0	55.6	106.5	106.2	106.6	91.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.3	57.2	100.0	100.0	100.0	88.0
EUF (%)	0.0	0.0	0.7	0.0	0.0	0.0	7.4	99.9	45.0	0.0	0.0	0.0	12.9
PUF (%)	0.0	0.0	0.7	0.0	0.0	0.0	0.0	99.9	45.0	0.0	0.0	0.0	12.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	7.4	0.0	0.0	0.0	0.0	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - JULY, SEPTEMBER - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 353010 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.08.01 TO 10.09.13. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION

5. Historical Summary

Date of Construction Start: 11 Jan 1982 Lifetime Generation: 128961.0 GW(e).h
 Date of First Criticality: 16/12/1988 Cumulative Energy Availability Factor: 71.9%
 Date of Grid Connection: 25/12/1988 Cumulative Load Factor: 70.5%
 Date of Commercial Operation: 04 Aug 1989 Cumulative Unit Capability Factor: 76.1%
 Cumulative Energy Unavailability Factor: 28.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	5483.4	950	88.4	88.4	88.4	88.4	87.4	87.4	6015	91.1
1990	5718.7	950	68.0	76.8	67.8	76.7	68.7	76.8	6696	76.4
1991	5403.4	950	67.1	73.3	64.2	72.1	64.9	72.5	6124	69.9
1992	5545.4	950	66.4	71.4	64.8	70.2	66.4	70.9	6202	70.6
1993	4378.6	950	61.6	69.4	52.7	66.5	52.6	67.0	5461	62.3
1994	3340.1	950	70.7	69.6	70.7	67.2	40.1	62.4	5389	61.5
1995	2674.7	950	53.1	67.2	47.5	64.3	32.1	57.9	5511	62.9
1996	5315.4	950	75.9	68.3	64.3	64.3	63.7	58.6	7085	80.7
1997	2058.8	950	38.8	64.9	25.3	59.9	24.7	54.8	3395	38.8
1998	5348.5	950	73.0	65.8	64.4	60.3	64.3	55.7	7136	81.5
1999	5458.0	950	72.0	66.3	65.6	60.8	65.6	56.7	6552	74.8
2000	6482.9	950	82.0	67.7	77.2	62.2	77.7	58.4	7327	83.4
2001	6050.7	950	78.6	68.5	72.1	63.0	72.7	59.6	6927	79.1
2002	6926.3	950	85.3	69.8	82.0	64.4	83.2	61.3	7478	85.4
2003	7016.1	950	85.1	70.8	83.2	65.6	84.3	62.8	7471	85.3
2004	7227.8	950	86.4	71.8	85.1	66.9	86.6	64.4	7607	86.6
2005	6244.4	950	79.9	72.3	74.5	67.3	75.0	65.0	7060	80.6
2006	7741.8	950	95.3	73.6	91.4	68.7	93.0	66.6	8354	95.4
2007	7407.1	950	91.8	74.5	87.6	69.7	89.0	67.8	8050	91.9
2008	7384.3	950	87.1	75.2	87.0	70.6	88.5	68.8	7693	87.6
2009	6932.7	950	82.6	75.5	82.6	71.1	83.3	69.5	7276	83.1
2010	7649.6	950	87.8	76.1	87.1	71.9	91.9	70.5	7710	88.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					98	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1050			1412	30	
D. Inspection, maintenance or repair without refuelling				243		
E. Testing of plant systems or components					1	
J. Grid limitation, failure or grid unavailability						66
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
Subtotal	1050	0	0	1655	139	66
Total		1050			1860	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		33
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		1
31. Turbine and auxiliaries		10
32. Feedwater and Main Steam System		6
33. Circulating Water System		9
35. All other I&C Systems		5
41. Main Generator Systems		5
42. Electrical Power Supply Systems		15
Total	0	84

RU-99 BALAKOVO-4

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7199.7 GW(e).h
Energy Availability Factor: 81.4%
Load Factor: 86.5%
Operating Factor: 81.8%
Energy Unavailability Factor: 18.6%
Total Off-line Time: 1592 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	459.3	667.8	759.9	731.4	313.4	0.0	539.0	733.7	733.2	768.1	736.0	757.7	7199.7
EAF (%)	62.5	98.3	100.0	100.0	42.0	0.0	75.1	99.2	100.0	100.0	100.0	100.0	81.4
UCF (%)	62.5	98.3	100.0	100.0	42.0	0.0	75.1	99.2	100.0	100.0	100.0	100.0	81.4
LF (%)	65.0	104.6	107.7	106.9	44.3	0.0	76.3	103.8	107.2	108.5	107.6	107.2	86.5
OF (%)	63.7	100.0	100.0	100.0	42.2	0.0	77.3	100.0	100.0	100.0	99.6	100.0	81.8
EUF (%)	37.5	1.7	0.0	0.0	58.0	100.0	24.9	0.8	0.0	0.0	0.0	0.0	18.6
PUF (%)	18.8	0.6	0.0	0.0	58.0	100.0	24.9	0.8	0.0	0.0	0.0	0.0	17.0
UCLF (%)	18.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MAY, JULY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 385535 MWH. THE UNIT WAS IN THE OVERHAUL OUTAGE FROM 10.05.14 TO 10.07.08. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION

5. Historical Summary

Date of Construction Start: 04 Jan 1984 **Lifetime Generation:** 110765.0 GW(e).h
Date of First Criticality: 24/03/1993 **Cumulative Energy Availability Factor:** 76.0%
Date of Grid Connection: 04 Nov 1993 **Cumulative Load Factor:** 75.6%
Date of Commercial Operation: 22/12/1993 **Cumulative Unit Capability Factor:** 81.0%
Cumulative Energy Unavailability Factor: 24.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	423.2	950	60.0	60.0	60.0	60.0	59.9	59.9	480	64.5
1994	3828.5	950	69.5	68.8	48.5	49.4	46.0	47.1	4604	52.6
1995	5610.0	950	88.7	78.3	86.5	67.1	67.4	56.8	8760	100.0
1996	4545.5	950	59.9	72.3	55.5	63.4	54.5	56.1	6652	75.7
1997	4637.7	950	71.3	72.1	59.6	62.4	55.7	56.0	6637	75.8
1998	5042.5	950	71.3	71.9	60.9	62.1	60.6	56.9	6936	79.2
1999	5803.9	950	77.5	72.9	69.6	63.4	69.7	59.0	7268	83.0
2000	6665.9	950	81.0	74.0	78.9	65.6	79.9	62.0	7216	82.1
2001	6578.1	950	83.9	75.2	78.3	67.1	79.0	64.1	7354	83.9
2002	6292.9	950	77.3	75.5	72.8	67.8	75.6	65.3	6723	76.7
2003	7223.8	950	85.8	76.5	84.6	69.4	86.8	67.5	7541	86.1
2004	7022.9	950	85.4	77.3	82.5	70.6	84.2	69.0	7540	85.8
2005	6938.3	950	87.6	78.1	82.1	71.6	83.4	70.2	7699	87.9
2006	6805.4	950	82.2	78.4	79.6	72.2	81.8	71.1	7230	82.5
2007	7153.3	950	88.5	79.2	84.7	73.1	86.0	72.1	7787	88.9
2008	8330.4	950	99.7	80.5	99.7	74.8	99.8	73.9	8779	99.9
2009	7410.0	950	87.8	81.0	87.8	75.7	89.0	74.9	7727	88.2
2010	7199.7	950	81.4	81.0	81.4	76.0	86.5	75.6	7168	81.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1994 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		138			10	
C. Inspection, maintenance or repair combined with refuelling	1319			1250		
D. Inspection, maintenance or repair without refuelling	132			19		
J. Grid limitation, failure or grid unavailability						19
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						98
Subtotal	1451	138	0	1269	10	117
Total		1589			1396	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1994 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		1
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System	138	1
35. All other I&C Systems		1
41. Main Generator Systems		0
42. Electrical Power Supply Systems		2
Total	138	7

RU-21 BELOYARSKY-3 (BN-600)

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: FBR
Net Reference Unit Power (RUP) at the beginning of 2010: 560.0 MW(e)
Design Net Capacity: 560.0 MW(e)
Design Discharge Burnup: 100000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3669.8 GW(e).h
Energy Availability Factor: 73.5%
Load Factor: 74.8%
Operating Factor: 74.7%
Energy Unavailability Factor: 26.5%
Total Off-line Time: 2219 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	402.5	375.8	368.5	0.0	0.0	248.0	420.9	425.1	418.9	192.4	391.8	425.8	3669.8
EAF (%)	96.3	99.4	88.0	0.0	0.0	61.3	98.3	100.0	100.0	45.7	94.4	100.0	73.5
UCF (%)	96.6	99.7	88.0	0.0	0.0	61.3	98.4	100.0	100.0	45.7	94.4	100.0	73.6
LF (%)	96.6	99.9	88.6	0.0	0.0	61.5	101.0	102.0	103.9	46.1	97.2	102.2	74.8
OF (%)	100.0	100.0	89.4	0.0	0.0	64.9	100.0	100.0	100.0	47.1	96.0	100.0	74.7
EUF (%)	3.7	0.6	12.0	100.0	100.0	38.7	1.7	0.0	0.0	54.3	5.6	0.0	26.5
PUF (%)	0.0	0.0	12.0	100.0	100.0	37.6	0.0	0.0	0.0	54.3	5.6	0.0	25.9
UCLF (%)	3.5	0.3	0.0	0.0	0.0	1.1	1.7	0.0	0.0	0.0	0.0	0.0	0.5
XUF (%)	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MARCH, JUNE - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 65009 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.03.28 TO 10.06.11. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 01 Jan 1969
Date of First Criticality: 26/02/1980
Date of Grid Connection: 04 Aug 1980
Date of Commercial Operation: 11 Jan 1981

Lifetime Generation: 108108.0 GW(e).h
Cumulative Energy Availability Factor: 73.8%
Cumulative Load Factor: 73.6%
Cumulative Unit Capability Factor: 74.5%
Cumulative Energy Unavailability Factor: 26.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981			Data not provided							
1982	2771.0	560	59.3	59.3	59.3	59.3	56.5	56.5	5555	63.4
1983	3545.2	560	73.4	66.3	72.7	66.0	72.3	64.4	6737	76.9
1984	3584.1	560	73.3	68.6	73.3	68.4	72.9	67.2	6848	78.0
1985	3561.8	560	72.9	69.7	72.9	69.5	72.6	68.6	6544	74.7
1986	3600.7	560	74.3	70.6	73.8	70.4	73.4	69.5	6818	77.8
1987	3895.0	600	75.9	71.5	75.9	71.4	74.1	70.3	6714	76.6
1988	3762.2	560	77.0	72.3	77.0	72.2	76.5	71.2	6810	77.5
1989	3694.4	560	77.0	72.9	77.0	72.8	75.3	71.7	6800	77.6
1990	3198.0	560	66.6	72.2	65.9	72.0	65.2	71.0	6627	75.7
1991	3394.0	560	63.6	71.3	63.6	71.2	69.2	70.8	6631	75.7
1992	4095.0	560	83.1	72.4	82.8	72.2	83.3	71.9	7449	84.8
1993	3914.9	560	79.6	73.0	79.5	72.8	79.8	72.6	7065	80.7
1994	3810.7	560	78.9	73.4	78.8	73.3	77.7	73.0	6977	79.6
1995	3413.3	560	72.3	73.4	70.7	73.1	69.6	72.7	6953	79.4
1996	3722.3	560	78.1	73.7	76.3	73.3	75.7	72.9	7010	79.8
1997	3545.8	560	74.6	73.7	73.0	73.3	72.3	72.9	6596	75.3
1998	2335.3	560	49.2	72.3	47.7	71.8	47.6	71.4	4385	50.1
1999	3721.0	560	78.0	72.6	76.2	72.0	75.9	71.7	6972	79.6
2000	3565.8	560	75.5	72.8	72.5	72.1	72.5	71.7	6820	77.6
2001	3891.1	560	80.7	73.2	79.9	72.4	79.3	72.1	7214	82.4
2002	3774.4	560	79.3	73.5	77.3	72.7	76.9	72.3	7069	80.7
2003	3693.3	560	76.8	73.6	75.7	72.8	75.3	72.4	6836	78.0
2004	3927.6	560	80.8	73.9	80.0	73.1	79.8	72.8	7185	81.8
2005	3802.7	560	78.8	74.1	77.8	73.3	77.5	73.0	6977	79.6
2006	3844.9	560	79.0	74.3	78.4	73.5	78.4	73.2	7001	79.9
2007	3798.4	560	77.8	74.4	77.5	73.7	77.4	73.3	7089	80.9
2008	3781.0	560	76.9	74.5	76.8	73.8	76.9	73.5	6918	78.8
2009	3736.6	560	75.6	74.6	75.6	73.9	76.2	73.6	6734	76.9
2010	3669.8	560	73.6	74.5	73.5	73.8	74.8	73.6	6541	74.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					162	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	2219			1271		
D. Inspection, maintenance or repair without refuelling				446	6	
H. Nuclear regulatory requirements						0
J. Grid limitation, failure or grid unavailability						3
Subtotal	2219	0	0	1717	169	3
Total		2219			1889	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		16
15. Reactor Cooling Systems		39
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		2
35. All other I&C Systems		5
42. Electrical Power Supply Systems		1
Total	0	67

RU-141 BILIBINO-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUF at the beginning of 2010): 11.0 MW(e)
Design Net Capacity: 11.0 MW(e)
Design Discharge Burnup: 3000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8.4 GW(e).h
Energy Availability Factor: 20.7%
Load Factor: 8.7%
Operating Factor: 16.9%
Energy Unavailability Factor: 79.3%
Total Off-line Time: 7279 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.4	8.4
EAF (%)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.8	100.0	100.0	20.7
UCF (%)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	6.8	100.0	100.0	20.7
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.9	54.0	8.7
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	100.0	100.0	16.9
EUF (%)	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	93.2	0.0	0.0	79.3
PUF (%)	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	95.5	93.2	0.0	0.0	79.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.01.01 TO 10.02.11. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES.

5. Historical Summary

Date of Construction Start: 01 Jan 1970 **Lifetime Generation:** 1829.0 GW(e).h
Date of First Criticality: 12 Nov 1973 **Cumulative Energy Availability Factor:** 65.7%
Date of Grid Connection: 01 Dec 1974 **Cumulative Load Factor:** 54.0%
Date of Commercial Operation: 04 Jan 1974 **Cumulative Unit Capability Factor:** 76.2%
Cumulative Energy Unavailability Factor: 34.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	45.3	10	88.0	88.0	88.0	88.0	68.7	68.7	5846	88.6
1975	56.5	10	80.2	83.6	74.4	80.2	64.5	66.3	7105	81.1
1976	55.5	10	90.9	86.2	83.7	81.5	63.2	65.2	7830	89.1
1977	43.7	10	81.4	85.0	70.4	78.5	49.9	61.1	6846	78.2
1978	53.8	10	91.3	86.3	91.3	81.2	61.5	61.2	7466	85.2
1979	64.8	10	81.2	85.4	76.0	80.3	74.0	63.4	7574	86.5
1980	59.4	10	81.8	84.9	74.1	79.4	67.6	64.0	8065	91.8
1981	50.7	10	82.0	84.5	72.7	78.5	57.9	63.2	7260	82.9
1982	72.3	10	85.0	84.6	85.0	79.3	82.5	65.4	7627	87.1
1983	69.9	10	88.7	85.0	83.3	79.7	79.8	66.9	7810	89.2
1984	77.9	10	88.9	85.3	88.0	80.5	88.7	68.9	7854	89.4
1985	77.7	10	91.2	85.8	88.4	81.1	88.7	70.6	8025	91.6
1986	73.2	10	86.1	85.9	83.2	81.3	83.5	71.6	7603	86.8
1987	76.7	12	81.3	85.5	81.3	81.3	73.0	71.7	7117	81.2
1988	79.6	11	90.3	85.8	90.3	82.0	82.4	72.5	7895	89.9
1989	70.9	11	90.0	86.1	90.0	82.5	73.5	72.6	7841	89.5
1990	76.6	11	85.1	86.0	85.1	82.7	79.5	73.0	7397	84.4
1991	71.6	11	78.6	85.6	78.6	82.4	74.3	73.1	6802	77.6
1992	67.1	11	85.8	85.6	85.8	82.6	69.4	72.9	7477	85.1
1993	53.2	11	86.3	85.7	62.7	81.6	55.2	72.0	7492	85.5
1994	49.6	11	86.9	85.7	86.9	81.8	51.5	70.9	7501	85.6
1995	26.6	11	41.6	83.6	41.6	79.9	27.6	68.8	3624	41.4
1996	29.6	11	54.1	82.2	54.1	78.7	30.7	67.1	4572	52.0
1997	35.2	11	56.5	81.1	56.5	77.7	36.6	65.7	4877	55.7
1998	55.5	11	96.3	81.7	67.0	77.3	57.6	65.4	8414	96.1
1999	33.4	11	54.9	80.7	40.3	75.8	34.7	64.1	4779	54.6
2000	58.8	11	87.4	80.9	68.1	75.5	60.8	64.0	7616	86.7
2001	45.9	11	72.9	80.6	55.0	74.7	47.6	63.4	6393	73.0
2002	49.6	11	84.5	80.8	60.0	74.2	51.5	63.0	7375	84.2
2003	25.8	11	55.8	79.9	34.1	72.8	26.8	61.7	4805	54.9
2004	34.6	11	85.2	80.1	46.6	71.9	35.8	60.8	7434	84.6
2005	26.2	11	79.8	80.1	38.5	70.8	27.2	59.7	6904	78.8
2006	23.9	11	84.3	80.2	36.3	69.7	24.8	58.6	7162	81.8
2007	28.4	11	85.6	80.4	40.7	68.8	29.5	57.7	7154	81.7
2008	29.5	11	72.6	80.1	72.6	68.9	30.5	56.9	6261	71.3
2009	0.0	11	0.0	77.8	0.0	67.0	0.0	55.3	0	0.0
2010	8.4	11	20.7	76.2	20.7	65.7	8.7	54.0	1481	16.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					66	
C. Inspection, maintenance or repair combined with refuelling	984			1261		
D. Inspection, maintenance or repair without refuelling				358	16	
E. Testing of plant systems or components	6295			129		
H. Nuclear regulatory requirements					25	
J. Grid limitation, failure or grid unavailability				2	0	36
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				7	10	7
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					1	
Subtotal	7279	0	0	1757	118	43
Total		7279			1918	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		0
13. Reactor Auxiliary Systems		4
14. Safety Systems		1
15. Reactor Cooling Systems		2
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		9
33. Circulating Water System		4
35. All other I&C Systems		2
41. Main Generator Systems		15
42. Electrical Power Supply Systems		1
Total	0	62

RU-142 BILIBINO-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUF at the beginning of 2010): 11.0 MW(e)
Design Net Capacity: 11.0 MW(e)
Design Discharge Burnup: 3000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 48.1 GW(e).h
Energy Availability Factor: 88.1%
Load Factor: 49.9%
Operating Factor: 87.1%
Energy Unavailability Factor: 11.9%
Total Off-line Time: 1133 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	5.2	4.9	5.4	2.1	0.0	3.8	4.0	4.8	5.7	5.0	3.3	4.0	48.1
EAF (%)	100.0	99.8	100.0	52.4	13.9	100.0	100.0	100.0	99.9	92.2	100.0	100.0	88.1
UCF (%)	100.0	99.8	100.0	52.4	13.9	100.0	100.0	100.0	99.9	92.2	100.0	100.0	88.1
LF (%)	63.0	66.4	65.5	26.3	0.0	47.4	49.0	59.0	71.9	60.9	41.3	49.2	49.9
OF (%)	100.0	99.7	100.0	50.1	9.8	100.0	100.0	100.0	99.9	86.6	100.0	100.0	87.1
EUf (%)	0.0	0.2	0.0	47.6	86.1	0.0	0.0	0.0	0.1	7.8	0.0	0.0	11.9
PUf (%)	0.0	0.2	0.0	47.6	86.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE.
 THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.04.16 TO 10.05.28. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES.

5. Historical Summary

Date of Construction Start: 01 Jan 1970
Date of First Criticality: 12 Jul 1974
Date of Grid Connection: 30/12/1974
Date of Commercial Operation: 02 Jan 1975

Lifetime Generation: 1848.0 GW(e).h
Cumulative Energy Availability Factor: 70.4%
Cumulative Load Factor: 55.4%
Cumulative Unit Capability Factor: 81.8%
Cumulative Energy Unavailability Factor: 29.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability		Energy Availability		Load Factor [%]		Annual Time Online	
			Factor [%]		Factor [%]		Factor [%]		Hours	OF [%]
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.		
1975	62.6	10	94.7	94.7	89.0	89.0	78.1	78.1	7226	90.1
1976	66.1	10	89.4	91.9	83.7	86.2	75.3	76.6	7901	89.9
1977	57.0	10	90.5	91.4	81.3	84.5	65.1	72.7	7865	89.8
1978	60.6	10	94.8	92.3	94.8	87.2	69.2	71.8	7929	90.5
1979	69.9	10	92.9	92.4	88.2	87.4	79.7	73.4	8170	93.3
1980	44.0	10	62.7	87.4	59.8	82.7	50.1	69.5	5666	64.5
1981	41.4	10	73.1	85.3	70.4	80.9	47.2	66.3	6520	74.4
1982	63.9	10	79.2	84.6	79.2	80.7	73.0	67.1	7028	80.2
1983	73.8	10	90.1	85.2	86.9	81.4	84.2	69.0	7880	90.0
1984	77.6	10	89.3	85.6	88.5	82.1	88.4	71.0	7891	89.8
1985	78.0	10	90.3	86.0	88.6	82.7	89.0	72.6	7940	90.6
1986	76.3	10	87.0	86.1	84.7	82.9	87.1	73.8	7679	87.7
1987	88.4	12	89.1	86.4	89.1	83.4	84.1	74.8	7794	89.0
1988	75.1	11	90.8	86.7	90.8	84.0	77.7	75.0	7927	90.2
1989	74.8	11	91.4	87.1	91.4	84.5	77.6	75.2	7943	90.7
1990	72.6	11	84.6	86.9	84.6	84.5	75.4	75.2	7274	83.0
1991	57.8	11	64.9	85.5	64.9	83.3	60.0	74.3	4821	55.0
1992	68.2	11	89.9	85.8	89.9	83.7	70.6	74.0	7857	89.4
1993	52.4	11	81.9	85.6	62.2	82.5	54.4	72.9	7072	80.7
1994	47.8	11	78.7	85.2	77.3	82.2	49.6	71.7	6763	77.2
1995	45.4	11	99.2	85.9	97.2	83.0	47.2	70.5	8677	99.1
1996	16.8	11	33.5	83.4	33.5	80.6	17.4	67.9	2894	32.9
1997	44.1	11	92.7	83.8	87.7	80.9	45.8	66.9	8050	91.9
1998	18.2	11	42.9	82.0	23.3	78.4	18.8	64.8	3727	42.5
1999	54.2	11	84.7	82.1	64.1	77.8	56.2	64.5	7355	84.0
2000	48.5	11	78.2	82.0	56.3	77.0	50.2	63.9	6656	75.8
2001	56.7	11	85.2	82.1	65.8	76.5	58.9	63.7	7439	84.9
2002	30.0	11	66.4	81.5	38.4	75.1	31.2	62.5	5744	65.6
2003	33.3	11	82.2	81.6	44.5	74.0	34.5	61.5	7162	81.8
2004	17.9	11	70.3	81.2	27.2	72.4	18.5	60.0	5851	66.6
2005	25.3	11	84.9	81.3	38.2	71.3	26.3	58.9	7351	83.9
2006	20.3	11	84.2	81.4	32.7	70.0	21.1	57.7	7248	82.7
2007	26.4	11	86.7	81.5	39.9	69.1	27.4	56.7	7478	85.4
2008	30.3	11	78.8	81.5	78.8	69.4	31.3	55.9	6490	73.9
2009	42.4	11	86.1	81.6	86.1	69.9	44.0	55.6	7388	84.3
2010	48.1	11	88.1	81.8	88.1	70.4	49.9	55.4	7627	87.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		77			124	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1030			1314	83	
D. Inspection, maintenance or repair without refuelling				132		
E. Testing of plant systems or components				5		
J. Grid limitation, failure or grid unavailability					0	16
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				5		14
L. Human factor related		23			0	
Subtotal	1030	100	0	1456	211	30
Total		1130			1697	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		70
12. Reactor I&C Systems	77	1
14. Safety Systems		0
15. Reactor Cooling Systems		7
16. Steam generation systems		3
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		8
33. Circulating Water System		0
41. Main Generator Systems		7
Total	77	116

RU-143 BILIBINO-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP) at the beginning of 2010: 11.0 MW(e)
Design Net Capacity: 11.0 MW(e)
Design Discharge Burnup: 3000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 33.7 GW(e).h
Energy Availability Factor: 77.5%
Load Factor: 35.0%
Operating Factor: 68.9%
Energy Unavailability Factor: 22.5%
Total Off-line Time: 2725 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	4.3	3.4	3.8	4.2	4.4	0.0	0.0	0.0	4.7	5.8	1.4	1.6	33.7
EAF (%)	100.0	94.7	100.0	100.0	100.0	14.2	4.5	18.4	100.0	100.0	100.0	100.0	77.5
UCF (%)	100.0	94.7	100.0	100.0	100.0	14.2	4.6	18.4	100.0	100.0	100.0	100.0	77.5
LF (%)	52.5	46.5	46.4	53.1	53.3	0.0	0.0	0.0	60.0	71.1	18.0	19.5	35.0
OF (%)	100.0	92.6	100.0	100.0	100.0	10.1	0.0	14.5	100.0	100.0	60.1	51.5	68.9
EUF (%)	0.0	5.3	0.0	0.0	0.0	85.8	95.5	81.6	0.0	0.0	0.0	0.0	22.5
PUF (%)	0.0	5.3	0.0	0.0	0.0	85.8	95.5	81.6	0.0	0.0	0.0	0.0	22.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE.
 THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.06.04 TO 10.08.27. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES.

5. Historical Summary

Date of Construction Start: 01 Jan 1970
Date of First Criticality: 12 Jun 1975
Date of Grid Connection: 22/12/1975
Date of Commercial Operation: 02 Jan 1976
Lifetime Generation: 1846.0 GW(e).h
Cumulative Energy Availability Factor: 69.7%
Cumulative Load Factor: 56.9%
Cumulative Unit Capability Factor: 81.3%
Cumulative Energy Unavailability Factor: 30.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	50.0	10	90.5	90.5	83.3	83.3	62.2	62.2	6222	77.4
1977	46.5	10	92.8	91.7	78.2	80.7	53.1	57.4	7533	86.0
1978	61.9	10	86.2	89.9	86.2	82.6	70.6	62.0	7514	85.8
1979	62.1	10	88.9	89.6	82.5	82.5	70.9	64.2	7837	89.5
1980	79.4	10	92.2	90.1	91.0	84.3	90.4	69.6	8130	92.6
1981	89.8	10	96.6	91.2	96.6	86.4	102.5	75.1	8480	96.8
1982	79.3	10	94.8	91.8	94.8	87.6	90.6	77.4	8323	95.0
1983	72.8	10	88.8	91.4	85.3	87.3	83.1	78.1	7782	88.8
1984	76.5	10	89.1	91.1	87.4	87.3	87.1	79.1	7876	89.7
1985	69.8	10	80.3	90.1	78.5	86.4	79.7	79.2	7119	81.3
1986	77.1	10	91.0	90.1	87.7	86.5	88.0	80.0	8001	91.3
1987	89.1	12	89.1	90.0	89.1	86.8	84.7	80.4	7801	89.1
1988	76.7	11	89.5	90.0	89.5	87.0	79.4	80.4	7815	89.0
1989	74.3	11	89.5	89.9	89.1	87.2	77.1	80.1	7756	88.5
1990	73.7	11	92.0	90.1	91.1	87.4	76.5	79.9	8024	91.6
1991	66.2	11	78.1	89.3	76.6	86.7	68.7	79.1	6749	77.0
1992	70.9	11	79.7	88.7	79.7	86.3	73.4	78.8	7727	88.0
1993	52.6	11	83.2	88.4	61.5	84.8	54.6	77.3	7218	82.4
1994	44.7	11	73.7	87.6	72.0	84.1	46.4	75.6	6342	72.4
1995	17.3	11	38.2	85.0	34.9	81.5	17.9	72.6	3293	37.6
1996	52.6	11	82.3	84.8	82.3	81.6	54.5	71.7	7142	81.3
1997	25.8	11	42.9	82.8	42.9	79.7	26.8	69.5	3769	43.0
1998	23.2	11	49.1	81.3	29.1	77.4	24.0	67.5	4200	47.9
1999	51.4	11	75.9	81.1	59.9	76.7	53.4	66.9	6607	75.4
2000	45.2	11	86.8	81.3	54.8	75.8	46.8	66.0	7569	86.2
2001	53.9	11	84.9	81.4	63.0	75.2	56.0	65.6	7383	84.3
2002	30.7	11	71.5	81.1	39.4	73.9	31.9	64.3	6250	71.3
2003	35.4	11	81.5	81.1	46.7	72.9	36.8	63.3	7097	81.0
2004	31.1	11	85.8	81.2	42.0	71.8	32.2	62.2	7166	81.6
2005	20.4	11	71.1	80.9	30.9	70.4	21.1	60.8	6102	69.7
2006	26.3	11	76.7	80.8	36.9	69.2	27.2	59.7	6542	74.7
2007	27.5	11	85.7	80.9	38.6	68.3	28.5	58.7	7257	82.8
2008	33.3	11	85.7	81.1	85.7	68.8	34.4	57.9	7335	83.5
2009	44.6	11	91.4	81.4	91.4	69.5	46.2	57.6	7972	91.0
2010	33.7	11	77.5	81.3	77.5	69.7	35.0	56.9	6035	68.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					58	
C. Inspection, maintenance or repair combined with refuelling	2027			1212		
D. Inspection, maintenance or repair without refuelling	50			323		
E. Testing of plant systems or components				6		
J. Grid limitation, failure or grid unavailability					1	44
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			648	14	1	16
Subtotal	2077	0	648	1555	60	60
Total		2725			1675	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		1
15. Reactor Cooling Systems		16
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		9
33. Circulating Water System		0
Total	0	39

RU-144 BILIBINO-4

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP) at the beginning of 2010: 11.0 MW(e)
Design Net Capacity: 11.0 MW(e)
Design Discharge Burnup: 3000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 37.5 GW(e).h
Energy Availability Factor: 86.9%
Load Factor: 38.9%
Operating Factor: 83.0%
Energy Unavailability Factor: 13.1%
Total Off-line Time: 1488 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	4.6	3.7	3.5	3.5	3.9	3.4	3.6	4.6	0.0	0.4	3.9	2.4	37.5
EAF (%)	99.9	100.0	100.0	100.0	100.0	99.9	100.0	100.0	11.0	32.4	100.0	100.0	86.9
UCF (%)	99.9	100.0	100.0	100.0	100.0	99.9	100.0	100.0	11.0	32.4	100.0	100.0	86.9
LF (%)	55.8	50.4	42.2	44.4	48.1	42.5	43.5	56.5	0.0	5.3	49.5	29.2	38.9
OF (%)	99.7	100.0	100.0	100.0	100.0	99.9	100.0	100.0	6.8	29.2	100.0	61.4	83.0
EUF (%)	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	89.0	67.6	0.0	0.0	13.1
PUF (%)	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	89.0	67.6	0.0	0.0	13.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE.
 THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.09.03 TO 10.10.22. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES.

5. Historical Summary

Date of Construction Start: 01 Jan 1970
Date of First Criticality: 12 Dec 1976
Date of Grid Connection: 27/12/1976
Date of Commercial Operation: 01 Jan 1977
Lifetime Generation: 1710.0 GW(e).h
Cumulative Energy Availability Factor: 68.3%
Cumulative Load Factor: 55.4%
Cumulative Unit Capability Factor: 79.4%
Cumulative Energy Unavailability Factor: 31.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	52.6	10	93.6	93.6	82.9	82.9	60.1	60.1	7392	84.4
1978	58.3	10	91.1	92.3	91.1	87.0	66.6	63.3	7827	89.3
1979	74.5	10	85.5	90.0	83.9	85.9	85.0	70.5	7552	86.2
1980	77.6	10	94.8	91.2	92.9	87.7	88.4	75.0	8347	95.0
1981	78.3	10	87.7	90.5	86.6	87.5	89.3	77.9	7734	88.3
1982	77.6	10	90.7	90.6	90.7	88.0	88.6	79.7	7976	91.1
1983	75.5	10	90.0	90.5	86.9	87.9	86.2	80.6	7923	90.4
1984	79.0	10	87.6	90.1	86.8	87.7	89.9	81.8	7744	88.2
1985	81.2	10	90.3	90.1	89.5	87.9	92.7	83.0	7919	90.4
1986	74.5	10	79.9	89.1	79.8	87.1	85.1	83.2	7083	80.9
1987	95.5	12	93.3	89.6	93.3	87.8	90.9	84.0	8154	93.1
1988	75.8	11	87.3	89.4	87.3	87.7	78.5	83.5	7617	86.7
1989	71.4	11	93.2	89.7	93.2	88.2	74.1	82.7	7853	89.6
1990	75.3	11	87.2	89.5	86.4	88.0	78.1	82.4	7588	86.6
1991	61.3	11	71.4	88.2	69.9	86.8	63.6	81.1	6139	70.1
1992	69.8	11	87.8	88.2	87.8	86.8	72.3	80.5	7756	88.3
1993	56.0	11	80.2	87.7	64.4	85.4	58.1	79.1	6918	79.0
1994	38.5	11	62.0	86.2	61.8	84.1	39.9	76.8	5266	60.1
1995	29.9	11	63.9	85.0	62.7	82.9	31.0	74.3	5083	58.0
1996	35.2	11	59.1	83.6	59.1	81.7	36.4	72.3	5109	58.2
1997	15.1	11	37.0	81.3	28.4	79.0	15.7	69.5	2490	28.4
1998	37.3	11	63.1	80.5	44.5	77.4	38.7	68.1	5510	62.9
1999	28.7	11	46.7	78.9	34.8	75.5	29.8	66.4	3993	45.6
2000	55.8	11	88.7	79.4	64.2	75.0	57.8	66.0	7740	88.1
2001	35.4	11	68.0	78.9	43.2	73.7	36.8	64.8	5931	67.7
2002	33.1	11	73.8	78.7	46.3	72.6	34.4	63.6	6419	73.3
2003	24.5	11	67.5	78.3	34.0	71.1	25.4	62.1	5849	66.8
2004	26.1	11	83.9	78.5	36.7	69.8	27.0	60.8	7303	83.1
2005	24.9	11	84.3	78.7	36.3	68.7	25.9	59.6	7300	83.3
2006	25.2	11	76.9	78.6	36.4	67.6	26.2	58.4	6626	75.6
2007	19.6	11	76.5	78.5	30.9	66.3	20.3	57.2	5983	68.3
2008	29.6	11	87.7	78.8	87.7	67.0	30.6	56.3	7023	80.0
2009	42.1	11	88.4	79.1	88.4	67.7	43.7	55.9	7663	87.5
2010	37.5	11	86.9	79.4	86.9	68.3	38.9	55.4	7272	83.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					55	
C. Inspection, maintenance or repair combined with refuelling	1198			1376		
D. Inspection, maintenance or repair without refuelling				406		
E. Testing of plant systems or components				7		
J. Grid limitation, failure or grid unavailability						69
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			287		1	35
L. Human factor related					0	
Subtotal	1198	0	287	1789	56	104
Total		1485			1949	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		13
13. Reactor Auxiliary Systems		7
15. Reactor Cooling Systems		1
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		7
33. Circulating Water System		5
41. Main Generator Systems		17
Total	0	53

RU-30 KALININ-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7006.1 GW(e).h
Energy Availability Factor: 82.6%
Load Factor: 84.2%
Operating Factor: 81.9%
Energy Unavailability Factor: 17.4%
Total Off-line Time: 1585 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	750.1	683.8	748.8	715.1	607.9	707.3	653.7	612.9	580.3	0.0	580.0	366.3	7006.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	93.5	85.3	80.5	0.0	82.1	53.2	82.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	94.0	85.9	80.5	0.0	82.1	53.2	82.7
LF (%)	106.1	107.1	106.1	104.6	86.0	103.4	92.5	86.7	84.8	0.0	84.8	51.8	84.2
OF (%)	100.0	100.0	100.0	100.0	86.8	100.0	94.2	86.8	80.8	0.0	83.6	53.6	81.9
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	6.5	14.7	19.5	100.0	17.9	46.8	17.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.5	100.0	17.6	0.0	11.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	6.0	14.1	0.0	0.0	0.3	46.8	5.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - SEPTEMBER, NOVEMBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 232503 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.09.25 TO 10.11.05. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 02 Jan 1977
Date of First Criticality: 04 Oct 1984
Date of Grid Connection: 05 Sep 1984
Date of Commercial Operation: 06 Dec 1985

Lifetime Generation: 159703.0 GW(e).h
Cumulative Energy Availability Factor: 72.8%
Cumulative Load Factor: 73.6%
Cumulative Unit Capability Factor: 73.8%
Cumulative Energy Unavailability Factor: 27.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	2799.6	950	58.3	58.3	58.3	58.3	57.4	57.4	3101	60.4
1986	5297.7	950	62.8	61.2	62.8	61.2	63.7	61.3	5946	67.9
1987	6842.5	1000	78.7	68.2	78.7	68.2	78.1	68.0	6972	79.6
1988	5891.6	950	70.1	68.7	70.1	68.7	70.6	68.7	6187	70.4
1989	6129.7	950	71.9	69.4	71.9	69.4	73.7	69.8	6396	73.0
1990	5192.3	950	61.6	68.0	61.5	68.0	62.4	68.5	5435	62.0
1991	6482.7	950	78.1	69.5	77.1	69.4	77.9	69.9	7161	81.7
1992	6781.4	950	80.4	70.9	80.3	70.8	81.3	71.4	7388	84.1
1993	4927.2	950	66.6	70.4	59.4	69.5	59.2	70.0	6133	70.0
1994	4437.6	950	54.4	68.8	54.1	67.9	53.3	68.3	5440	62.1
1995	4699.0	950	57.0	67.7	56.8	66.8	56.5	67.1	6265	71.5
1996	4431.7	950	53.3	66.4	53.2	65.7	53.1	65.9	5628	64.1
1997	5197.1	950	65.0	66.3	63.2	65.5	62.4	65.7	6195	70.7
1998	6101.0	950	73.3	66.8	73.0	66.0	73.3	66.2	6937	79.2
1999	5775.1	950	73.1	67.3	69.3	66.3	69.4	66.4	6589	75.2
2000	6289.7	950	76.8	67.9	75.0	66.8	75.4	67.0	6784	77.2
2001	6627.5	950	79.4	68.6	78.2	67.5	79.6	67.8	7020	80.1
2002	7248.4	950	86.1	69.6	84.7	68.5	87.1	68.9	7568	86.4
2003	7155.9	950	83.7	70.3	83.1	69.3	86.0	69.8	7408	84.6
2004	6937.0	950	81.5	70.9	80.7	69.8	83.1	70.5	7179	81.7
2005	6836.3	950	81.5	71.4	80.4	70.3	82.1	71.0	7219	82.4
2006	6743.6	950	80.6	71.8	79.5	70.8	81.0	71.5	7112	81.2
2007	7150.4	950	85.2	72.4	84.0	71.4	85.9	72.1	7491	85.5
2008	6953.5	950	81.5	72.8	81.5	71.8	83.3	72.6	7209	82.1
2009	7234.7	950	87.3	73.4	87.3	72.4	86.9	73.2	7669	87.5
2010	7006.1	950	82.7	73.8	82.6	72.8	84.2	73.6	7175	81.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		486			255	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1001			1510	41	
D. Inspection, maintenance or repair without refuelling				96		
E. Testing of plant systems or components					1	
J. Grid limitation, failure or grid unavailability			98			
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					48	
L. Human factor related					1	
Subtotal	1001	486	98	1606	350	0
Total		1585			1956	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	344	11
12. Reactor I&C Systems		11
15. Reactor Cooling Systems		2
16. Steam generation systems		40
17. Safety I&C Systems (excluding reactor I&C)	42	4
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		28
35. All other I&C Systems		7
41. Main Generator Systems	98	100
42. Electrical Power Supply Systems		8
Total	484	245

RU-31 KALININ-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7423.5 GW(e).h
Energy Availability Factor: 87.8%
Load Factor: 89.2%
Operating Factor: 86.7%
Energy Unavailability Factor: 12.2%
Total Off-line Time: 1165 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	571.3	673.9	746.6	708.7	717.8	701.8	201.6	255.2	643.2	749.9	722.8	730.7	7423.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	29.3	37.3	89.1	100.0	100.0	100.0	87.8
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	29.3	37.3	89.1	100.0	100.0	100.0	87.8
LF (%)	80.8	105.6	105.8	103.6	101.6	102.6	28.5	36.1	94.0	106.0	105.7	103.4	89.2
OF (%)	85.3	100.0	100.0	100.0	100.0	100.0	29.6	38.7	89.4	100.0	100.0	100.0	86.7
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	70.7	62.7	10.9	0.0	0.0	0.0	12.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	70.7	57.5	0.0	0.0	0.0	0.0	10.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	11.0	0.0	0.0	0.0	1.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 264892 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.07.10 TO 10.08.18. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 02 Jan 1982 **Lifetime Generation:** 148751.0 GW(e).h
Date of First Criticality: 25/11/1986 **Cumulative Energy Availability Factor:** 73.0%
Date of Grid Connection: 12 Mar 1986 **Cumulative Load Factor:** 74.6%
Date of Commercial Operation: 03 Mar 1987 **Cumulative Unit Capability Factor:** 75.8%
Cumulative Energy Unavailability Factor: 27.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	5815.1	1000	86.3	86.3	86.3	86.3	79.2	79.2	6460	88.0
1988	5829.4	950	71.7	78.5	71.7	78.5	69.9	74.2	6446	73.4
1989	6580.5	950	78.5	78.5	78.5	78.5	79.1	75.9	7034	80.3
1990	6788.2	950	79.5	78.7	79.5	78.7	81.6	77.4	7083	80.9
1991	4729.7	950	49.8	72.8	49.8	72.8	56.8	73.2	5154	58.8
1992	5496.3	950	65.7	71.6	65.7	71.6	65.9	71.9	6145	70.0
1993	5862.3	950	56.5	69.4	51.9	68.7	70.4	71.7	7078	80.8
1994	4463.8	950	54.9	67.6	54.9	67.0	53.6	69.4	6989	79.8
1995	5769.7	950	72.4	68.1	69.5	67.3	69.3	69.4	7283	83.1
1996	4595.2	950	78.4	69.1	56.0	66.1	55.1	68.0	7501	85.4
1997	3880.6	950	62.7	68.6	47.3	64.4	46.6	66.0	6117	69.8
1998	4946.7	950	60.0	67.8	59.7	64.0	59.4	65.4	6839	78.1
1999	6379.3	950	80.0	68.8	76.2	64.9	76.7	66.3	7155	81.7
2000	6418.7	950	83.6	69.8	76.3	65.8	76.9	67.1	7441	84.7
2001	6709.0	950	80.0	70.5	79.2	66.7	80.6	68.0	7070	80.7
2002	7003.4	950	85.8	71.5	82.7	67.7	84.2	69.0	7554	86.2
2003	7329.5	950	85.9	72.3	85.3	68.7	88.1	70.1	7541	86.1
2004	7398.2	950	87.1	73.2	86.7	69.7	88.7	71.2	7674	87.4
2005	6116.3	950	73.6	73.2	72.1	69.8	73.5	71.3	6476	73.9
2006	7074.9	950	84.3	73.7	82.7	70.5	85.0	72.0	7400	84.5
2007	7231.4	950	85.5	74.3	84.2	71.1	86.9	72.7	7539	86.1
2008	7474.8	950	88.2	74.9	88.2	71.9	89.6	73.5	7756	88.3
2009	7004.2	950	82.5	75.3	82.5	72.4	84.2	73.9	7248	82.7
2010	7423.5	950	87.8	75.8	87.8	73.0	89.2	74.6	7595	86.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		32			204	
B. Refuelling without a maintenance					12	
C. Inspection, maintenance or repair combined with refuelling	947			1308	9	
D. Inspection, maintenance or repair without refuelling				81		
J. Grid limitation, failure or grid unavailability			109			
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	
L. Human factor related		76				
Z. Others					0	
Subtotal	947	108	109	1389	228	0
Total		1164			1617	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		8
12. Reactor I&C Systems		25
15. Reactor Cooling Systems		36
17. Safety I&C Systems (excluding reactor I&C)	32	2
31. Turbine and auxiliaries		39
32. Feedwater and Main Steam System		6
35. All other I&C Systems		8
41. Main Generator Systems		63
42. Electrical Power Supply Systems		2
XX. Miscellaneous Systems		2
Total	32	191

RU-36 KALININ-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6902.2 GW(e).h
Energy Availability Factor: 82.1%
Load Factor: 82.9%
Operating Factor: 82.7%
Energy Unavailability Factor: 17.9%
Total Off-line Time: 1512 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	728.7	661.1	729.4	529.6	0.0	87.9	639.4	695.5	698.5	721.8	690.0	720.3	6902.2
EAF (%)	100.0	100.0	100.0	76.8	0.0	20.0	91.4	98.2	100.0	99.9	100.0	100.0	82.1
UCF (%)	100.0	100.0	100.0	76.9	0.0	20.0	93.1	100.0	100.0	99.9	100.0	100.0	82.4
LF (%)	103.1	103.5	103.3	77.4	0.0	12.9	90.5	98.4	102.1	102.0	100.9	101.9	82.9
OF (%)	100.0	100.0	100.0	77.4	0.0	20.7	95.4	100.0	100.0	100.0	100.0	100.0	82.7
EUf (%)	0.0	0.0	0.0	23.2	100.0	80.0	8.6	1.8	0.0	0.1	0.0	0.0	17.9
PUf (%)	0.0	0.0	0.0	23.1	100.0	73.3	1.2	0.0	0.0	0.0	0.0	0.0	16.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	6.7	5.7	0.0	0.0	0.1	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.1	0.0	0.0	1.7	1.8	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - APRIL, JULY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 101488 MWH. THE UNIT WAS IN THE OVERHAUL MAINTENANCE OUTAGE FROM 10.04.24 TO 10.06.22. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 10 Jan 1985
Date of First Criticality: 25/11/2004
Date of Grid Connection: 16/12/2004
Date of Commercial Operation: 11 Aug 2005

Lifetime Generation: 39089.0 GW(e).h
Cumulative Energy Availability Factor: 83.7%
Cumulative Load Factor: 84.0%
Cumulative Unit Capability Factor: 83.9%
Cumulative Energy Unavailability Factor: 16.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2005	1402.5	950	100.0	100.0	100.0	100.0	100.8	100.8	1464	100.0
2006	6287.2	950	75.2	78.7	74.9	78.5	75.5	79.2	6692	76.4
2007	7185.2	950	85.5	81.9	85.0	81.5	86.3	82.5	7505	85.7
2008	7561.7	950	87.8	83.7	87.7	83.5	90.6	85.1	7737	88.1
2009	6806.5	950	86.0	84.3	86.0	84.1	81.8	84.3	7553	86.2
2010	6902.2	950	82.4	83.9	82.1	83.7	82.9	84.0	7248	82.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		78			129	
C. Inspection, maintenance or repair combined with refuelling	1434			948	35	
L. Human factor related					1	
Subtotal	1434	78	0	948	165	0
Total		1512			1113	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
15. Reactor Cooling Systems		15
16. Steam generation systems		11
31. Turbine and auxiliaries		25
32. Feedwater and Main Steam System		26
33. Circulating Water System		2
41. Main Generator Systems	78	34
42. Electrical Power Supply Systems		14
Total	78	127

RU-12 KOLA-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 411.0 MW(e)
Design Net Capacity: 411.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2468.0 GW(e).h
Energy Availability Factor: 85.8%
Load Factor: 68.5%
Operating Factor: 90.3%
Energy Unavailability Factor: 14.2%
Total Off-line Time: 848 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	270.6	245.4	307.3	215.6	84.9	23.0	230.0	253.9	261.9	214.5	161.0	199.8	2468.0
EAF (%)	100.0	100.0	100.0	77.2	30.6	21.6	100.0	100.0	100.0	100.0	100.0	100.0	85.8
UCF (%)	100.0	100.0	100.0	77.2	30.9	21.6	100.0	100.0	100.0	100.0	100.0	100.0	85.8
LF (%)	88.5	88.8	100.6	72.9	27.8	7.8	75.2	83.0	88.5	70.0	54.4	65.3	68.5
OF (%)	100.0	100.0	100.0	100.0	61.8	21.7	100.0	100.0	100.0	100.0	100.0	100.0	90.3
EUF (%)	0.0	0.0	0.0	22.8	69.4	78.4	0.0	0.0	0.0	0.0	0.0	0.0	14.2
PUF (%)	0.0	0.0	0.0	22.8	69.1	78.4	0.0	0.0	0.0	0.0	0.0	0.0	14.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN MARCH. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 1826 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.05.20 TO 10.06.24. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 05 Jan 1970
Date of First Criticality: 26/06/1973
Date of Grid Connection: 29/06/1973
Date of Commercial Operation: 28/12/1973

Lifetime Generation: 88315.0 GW(e).h
Cumulative Energy Availability Factor: 70.7%
Cumulative Load Factor: 65.6%
Cumulative Unit Capability Factor: 77.2%
Cumulative Energy Unavailability Factor: 29.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	232.3	411	100.0	100.0	100.0	100.0	76.0	76.0	744	100.0
1974	1990.1	411	79.2	80.9	79.2	80.8	55.3	56.9	8463	96.6
1975	1015.8	411	50.9	66.5	50.9	66.5	28.2	43.1	5426	61.9
1976	2421.7	411	74.2	69.0	74.1	68.9	67.1	50.9	8247	93.9
1977	2101.1	411	76.4	70.8	76.4	70.8	58.4	52.7	7462	85.2
1978	2978.8	411	82.6	73.1	82.6	73.1	82.7	58.6	8074	92.2
1979	2435.6	411	64.6	71.7	64.6	71.7	67.6	60.1	6232	71.1
1980	3466.4	411	91.1	74.5	90.9	74.4	96.0	65.2	8072	91.9
1981	2870.8	411	81.0	75.3	80.9	75.2	79.7	67.0	7448	85.0
1982	2848.1	411	85.5	76.4	85.5	76.4	79.1	68.3	7875	89.9
1983	3217.4	411	88.3	77.6	88.2	77.5	89.4	70.4	7884	90.0
1984	3112.0	411	84.9	78.2	84.9	78.2	86.2	71.8	8060	91.8
1985	2388.8	411	67.0	77.3	67.0	77.3	66.3	71.4	6001	68.5
1986	2805.8	411	85.1	77.9	85.1	77.9	77.9	71.9	8074	92.2
1987	3268.2	440	86.0	78.5	86.0	78.5	84.8	72.9	7972	91.0
1988	2925.0	411	82.7	78.8	82.7	78.8	81.0	73.4	7482	85.2
1989	2675.5	411	76.2	78.6	75.4	78.6	74.3	73.5	6731	76.8
1990	2735.5	411	76.0	78.5	76.0	78.4	76.0	73.6	6838	78.1
1991	2773.1	411	77.3	78.4	77.3	78.3	77.0	73.8	6965	79.5
1992	2271.4	411	63.7	77.6	63.4	77.6	62.9	73.2	6651	75.7
1993	1992.6	411	59.6	76.7	56.1	76.5	55.3	72.3	5663	64.6
1994	1971.6	411	58.6	75.9	56.5	75.6	54.8	71.5	5359	61.2
1995	1581.4	411	62.2	75.3	62.2	75.0	43.9	70.3	5398	61.6
1996	1410.0	411	47.4	74.1	46.4	73.7	39.1	68.9	4466	50.8
1997	2404.1	411	88.5	74.7	88.5	74.3	66.8	68.8	7942	90.7
1998	1291.7	411	59.3	74.1	37.7	72.9	35.9	67.5	5658	64.6
1999	2028.5	411	86.6	74.5	58.0	72.3	56.3	67.1	7355	84.0
2000	1298.8	411	84.1	74.9	37.2	71.0	36.0	65.9	4643	52.9
2001	2243.2	411	81.6	75.1	63.3	70.7	62.3	65.8	7098	81.0
2002	1841.5	411	68.9	74.9	51.7	70.1	51.1	65.3	5660	64.6
2003	2164.0	411	75.5	74.9	60.4	69.8	60.1	65.1	6444	73.6
2004	2440.5	411	83.6	75.2	68.2	69.7	67.6	65.2	7326	83.4
2005	2151.7	411	90.6	75.7	60.6	69.4	59.8	65.0	6901	78.8
2006	2338.7	411	89.9	76.1	66.0	69.3	65.0	65.0	7661	87.5
2007	2658.0	411	91.0	76.6	74.4	69.5	73.8	65.3	7740	88.4
2008	2705.8	411	84.3	76.8	84.3	69.9	74.9	65.6	7397	84.2
2009	2277.4	411	83.8	77.0	83.8	70.3	63.3	65.5	7333	83.7
2010	2468.0	411	85.8	77.2	85.8	70.7	68.5	65.6	7912	90.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					55	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	848			1320	3	
D. Inspection, maintenance or repair without refuelling				171		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				70		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						6
J. Grid limitation, failure or grid unavailability						168
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	2
Subtotal	848	0	0	1561	70	176
Total		848			1807	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		4
15. Reactor Cooling Systems		15
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		7
35. All other I&C Systems		1
42. Electrical Power Supply Systems		1
Total	0	35

RU-13 KOLA-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 411.0 MW(e)
 Design Net Capacity: 411.0 MW(e)
 Design Discharge Burnup: 28600 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2531.2 GW(e).h
 Energy Availability Factor: 90.2%
 Load Factor: 70.3%
 Operating Factor: 87.0%
 Energy Unavailability Factor: 9.8%
 Total Off-line Time: 1141 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	186.1	187.5	315.6	265.3	309.7	223.5	278.1	131.7	0.2	109.4	230.9	293.2	2531.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	84.3	3.0	93.9	100.0	100.0	90.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.1	3.0	93.9	100.0	100.0	90.4
LF (%)	60.9	67.9	103.3	89.7	101.3	75.5	90.9	43.1	0.1	35.7	78.0	95.9	70.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	81.0	3.1	59.5	100.0	100.0	87.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7	97.0	6.1	0.0	0.0	9.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	97.0	6.1	0.0	0.0	9.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN MARCH, MAY. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 12137 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.08.28 TO 10.09.30. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 05 Jan 1970 Lifetime Generation: 85847.0 GW(e).h
 Date of First Criticality: 30/11/1974 Cumulative Energy Availability Factor: 71.5%
 Date of Grid Connection: 12 Aug 1974 Cumulative Load Factor: 66.3%
 Date of Commercial Operation: 21/02/1975 Cumulative Unit Capability Factor: 77.2%
 Cumulative Energy Unavailability Factor: 28.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	1325.2	411	88.2	88.2	88.2	88.2	40.2	40.2	6040	75.3
1976	1943.1	411	70.8	79.1	70.8	79.1	53.8	47.3	7083	80.6
1977	2627.2	411	77.1	78.4	76.9	78.4	73.0	56.1	7038	80.3
1978	2982.5	411	82.7	79.5	82.7	79.5	82.8	62.9	7576	86.5
1979	3057.6	411	83.5	80.3	82.4	80.1	84.9	67.4	7663	87.5
1980	3266.9	411	86.0	81.3	85.8	81.0	90.5	71.3	7966	90.7
1981	3146.7	411	87.8	82.2	87.8	82.0	87.4	73.6	8225	93.9
1982	2463.0	411	71.2	80.8	71.2	80.7	68.4	73.0	6742	77.0
1983	3072.6	411	85.3	81.3	85.3	81.2	85.3	74.4	7963	90.9
1984	3034.5	411	86.8	81.9	86.8	81.7	84.1	75.3	8079	92.0
1985	3055.6	411	84.9	82.2	84.9	82.0	84.9	76.2	7872	89.9
1986	2844.2	411	79.8	82.0	79.7	81.8	79.0	76.5	7405	84.5
1987	3345.4	440	89.6	82.6	89.6	82.5	86.8	77.3	7900	90.2
1988	2873.3	411	80.5	82.4	80.5	82.3	79.6	77.5	7451	84.8
1989	2707.3	411	78.0	82.1	74.8	81.8	75.2	77.3	6859	78.3
1990	2610.9	411	72.9	81.6	72.7	81.3	72.5	77.0	6751	77.1
1991	2701.9	411	75.4	81.2	75.3	80.9	75.0	76.9	6983	79.7
1992	2133.0	411	61.8	80.1	61.8	79.8	59.1	75.9	5871	66.8
1993	2138.8	411	65.7	79.4	60.7	78.8	59.4	75.0	6377	72.8
1994	398.6	411	16.7	76.2	16.7	75.7	11.1	71.8	1466	16.7
1995	2205.8	411	93.6	77.1	93.6	76.6	61.3	71.3	6846	78.2
1996	1946.2	411	66.3	76.6	65.5	76.1	53.9	70.5	6243	71.1
1997	1157.9	411	53.4	75.6	40.6	74.5	32.2	68.9	3955	45.1
1998	2655.6	411	83.6	75.9	74.5	74.5	73.8	69.1	8029	91.7
1999	1272.6	411	49.0	74.8	36.3	73.0	35.3	67.7	4423	50.5
2000	2430.5	411	83.4	75.2	68.2	72.8	67.3	67.7	7626	86.8
2001	1722.3	411	84.7	75.5	49.1	71.9	47.8	67.0	6574	75.0
2002	1738.7	411	83.2	75.8	48.7	71.1	48.3	66.3	5564	63.5
2003	1866.1	411	66.4	75.5	52.0	70.4	51.8	65.8	5459	62.3
2004	1787.1	411	73.8	75.4	49.9	69.8	49.5	65.3	5731	65.2
2005	2889.2	411	84.2	75.7	78.6	70.0	80.2	65.7	7379	84.2
2006	2640.1	411	85.7	76.0	72.0	70.1	73.3	66.0	7597	86.7
2007	2508.9	411	85.7	76.3	70.1	70.1	69.7	66.1	7474	85.3
2008	2554.7	411	89.9	76.7	89.1	70.7	70.8	66.2	7762	88.4
2009	2384.6	411	80.3	76.8	79.4	70.9	66.2	66.2	6872	78.4
2010	2531.2	411	90.4	77.2	90.2	71.5	70.3	66.3	7619	87.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					82	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	794			1373		
D. Inspection, maintenance or repair without refuelling				69		
E. Testing of plant systems or components				8		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				136		
J. Grid limitation, failure or grid unavailability			347			178
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	23
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					0	
Subtotal	794	0	347	1586	82	201
Total		1141			1869	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1975 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			46
12. Reactor I&C Systems			1
13. Reactor Auxiliary Systems			2
14. Safety Systems			2
15. Reactor Cooling Systems			20
16. Steam generation systems			3
17. Safety I&C Systems (excluding reactor I&C)			0
31. Turbine and auxiliaries			0
32. Feedwater and Main Steam System			0
35. All other I&C Systems			0
41. Main Generator Systems			0
42. Electrical Power Supply Systems			0
Total	0		74

RU-32 KOLA-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 411.0 MW(e)
 Design Net Capacity: 411.0 MW(e)
 Design Discharge Burnup: 28600 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1979.2 GW(e).h
 Energy Availability Factor: 71.5%
 Load Factor: 55.0%
 Operating Factor: 68.6%
 Energy Unavailability Factor: 28.5%
 Total Off-line Time: 2751 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	252.1	228.5	0.0	0.0	0.0	120.9	91.1	194.5	247.9	280.7	272.6	291.0	1979.2
EAF (%)	99.9	100.0	0.2	0.0	0.0	68.3	99.9	100.0	91.2	100.0	100.0	100.0	71.5
UCF (%)	99.9	100.0	0.2	0.0	0.0	68.3	99.9	100.0	91.2	100.0	100.0	100.0	71.5
LF (%)	82.4	82.7	0.0	0.0	0.0	40.8	29.8	63.6	83.8	91.7	92.1	95.2	55.0
OF (%)	99.7	100.0	0.3	0.0	0.0	68.3	66.3	100.0	91.0	100.0	100.0	100.0	68.6
EUf (%)	0.1	0.0	99.8	100.0	100.0	31.7	0.1	0.0	8.8	0.0	0.0	0.0	28.5
PUF (%)	0.0	0.0	99.8	100.0	100.0	31.7	0.0	0.0	0.0	0.0	0.0	0.0	27.8
UCLF (%)	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.8	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE.
 THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.03.01 TO 10.06.10. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 04 Jan 1977 Lifetime Generation: 72908.0 GW(e).h
 Date of First Criticality: 02 Jul 1981 Cumulative Energy Availability Factor: 74.5%
 Date of Grid Connection: 24/03/1981 Cumulative Load Factor: 69.7%
 Date of Commercial Operation: 12 Mar 1982 Cumulative Unit Capability Factor: 82.4%
 Cumulative Energy Unavailability Factor: 25.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	301.9	411	99.4	99.4	99.3	99.3	98.7	98.7	744	100.0
1983	2459.9	411	72.0	74.1	72.0	74.1	68.3	70.7	6818	77.8
1984	2830.7	411	82.7	78.3	82.7	78.2	78.4	74.4	7610	86.6
1985	2972.6	411	86.8	81.0	86.7	81.0	82.6	77.0	7814	89.2
1986	2627.3	411	74.1	79.3	74.1	79.3	73.0	76.0	7244	82.7
1987	2837.8	440	74.8	78.4	74.8	78.4	73.6	75.5	7024	80.2
1988	2933.2	411	81.5	78.9	81.4	78.9	81.2	76.5	7913	90.1
1989	3186.7	411	90.5	80.5	87.8	80.1	88.5	78.2	8047	91.9
1990	3256.9	411	89.8	81.6	89.7	81.3	90.5	79.7	8022	91.6
1991	2935.2	411	79.8	81.4	79.8	81.1	81.5	79.9	7188	82.1
1992	2806.4	411	87.9	82.1	87.8	81.8	77.7	79.7	7396	84.2
1993	2548.0	411	81.9	82.1	70.5	80.8	70.8	78.9	6833	78.0
1994	2466.0	411	70.9	81.2	70.8	79.9	68.5	78.0	6373	72.8
1995	2526.1	411	81.0	81.1	80.6	80.0	70.2	77.4	7083	80.9
1996	2327.3	411	79.8	81.0	79.8	80.0	64.5	76.5	6928	78.9
1997	2340.5	411	78.5	80.9	75.0	79.7	65.0	75.7	7114	81.2
1998	2006.3	411	86.3	81.2	56.3	78.2	55.7	74.5	6705	76.5
1999	2140.6	411	72.6	80.7	59.9	77.1	59.5	73.6	7040	80.4
2000	2244.7	411	87.9	81.1	62.5	76.3	62.2	73.0	7731	88.0
2001	2543.3	411	85.3	81.3	70.6	76.0	70.6	72.9	7057	80.6
2002	2742.4	411	91.4	81.8	75.9	76.0	76.2	73.0	7909	90.3
2003	2740.7	411	83.7	81.9	75.6	76.0	76.1	73.2	7335	83.7
2004	2816.8	411	88.1	82.2	77.4	76.1	78.0	73.4	7688	87.5
2005	2059.4	411	88.5	82.5	57.6	75.3	57.2	72.7	7672	87.6
2006	2294.6	411	90.0	82.8	64.0	74.8	63.7	72.3	7436	84.9
2007	1815.3	411	82.9	82.8	50.7	73.9	50.4	71.5	6506	74.3
2008	1876.7	411	83.8	82.8	83.8	74.2	52.0	70.7	7405	84.3
2009	2050.5	411	83.8	82.9	83.1	74.6	57.0	70.2	7340	83.8
2010	1979.2	411	71.5	82.4	71.5	74.5	55.0	69.7	6009	68.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		67			67	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	2433			1057		
D. Inspection, maintenance or repair without refuelling				82		
E. Testing of plant systems or components				13	0	
J. Grid limitation, failure or grid unavailability			226		14	125
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	7
L. Human factor related		24			1	
Subtotal	2433	91	226	1152	86	132
Total		2750			1370	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		31
15. Reactor Cooling Systems	65	9
16. Steam generation systems		7
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		6
41. Main Generator Systems		0
42. Electrical Power Supply Systems	2	5
XX. Miscellaneous Systems		0
Total	67	64

RU-33 KOLA-4

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 411.0 MW(e)
 Design Net Capacity: 411.0 MW(e)
 Design Discharge Burnup: 28600 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2956.7 GW(e).h
 Energy Availability Factor: 84.7%
 Load Factor: 82.1%
 Operating Factor: 83.7%
 Energy Unavailability Factor: 15.3%
 Total Off-line Time: 1428 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	308.9	263.6	314.8	287.3	312.0	212.4	0.0	57.0	308.3	313.4	260.9	318.2	2956.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	93.3	0.0	26.7	100.0	100.0	100.0	100.0	84.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	93.3	0.0	26.7	100.0	100.0	100.0	100.0	84.7
LF (%)	101.0	95.4	103.1	97.1	102.0	71.8	0.0	18.6	104.2	102.4	88.2	104.1	82.1
OF (%)	100.0	100.0	100.0	100.0	100.0	91.9	0.0	26.9	100.0	100.0	88.6	100.0	83.7
EUf (%)	0.0	0.0	0.0	0.0	0.0	6.7	100.0	73.3	0.0	0.0	0.0	0.0	15.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	6.7	100.0	73.3	0.0	0.0	0.0	0.0	15.3
UCLF (%)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY, MARCH, MAY, SEPTEMBER, OCTOBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 31630 MWH. THE UNIT WAS IN THE OVERHAUL OUTAGE FROM 10.06.09 TO 10.08.23. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 08 Jan 1976 Lifetime Generation: 67367.0 GW(e).h
 Date of First Criticality: 10 Jul 1984 Cumulative Energy Availability Factor: 74.1%
 Date of Grid Connection: 10 Nov 1984 Cumulative Load Factor: 71.7%
 Date of Commercial Operation: 12 Jun 1984 Cumulative Unit Capability Factor: 82.2%
 Cumulative Energy Unavailability Factor: 25.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	168.5	411	100.0	100.0	100.0	100.0	55.1	55.1	730	98.1
1985	2585.8	411	78.2	79.9	78.2	79.9	71.8	70.5	7751	88.5
1986	2690.2	411	72.4	76.3	72.4	76.3	74.7	72.5	7230	82.5
1987	3341.2	440	85.5	79.4	85.5	79.4	86.7	77.3	7861	89.7
1988	3124.2	411	85.0	80.7	84.9	80.7	86.5	79.6	7762	88.4
1989	3111.5	411	87.6	82.1	85.8	81.7	86.4	80.9	7793	89.0
1990	2930.4	411	80.3	81.8	80.2	81.5	81.4	81.0	7142	81.5
1991	2790.5	411	76.7	81.1	76.7	80.8	77.5	80.5	7429	84.8
1992	2764.9	411	80.5	81.0	80.0	80.7	76.6	80.0	7253	82.6
1993	2827.0	411	92.4	82.2	79.0	80.5	78.5	79.8	8247	94.1
1994	1939.8	411	62.7	80.3	55.8	78.1	53.9	77.3	5915	67.5
1995	2288.8	411	73.8	79.7	73.8	77.7	63.6	76.1	7022	80.2
1996	2537.7	411	84.1	80.1	84.1	78.2	70.3	75.6	7792	88.7
1997	2271.7	411	76.2	79.8	74.6	78.0	63.1	74.6	6848	78.2
1998	1927.6	411	69.4	79.1	49.2	75.9	53.5	73.1	6336	72.3
1999	2567.5	411	82.0	79.3	71.2	75.6	71.3	73.0	7193	82.1
2000	2177.5	411	86.3	79.7	60.4	74.7	60.3	72.2	7096	80.8
2001	2447.1	411	87.4	80.1	68.0	74.3	68.0	72.0	7149	81.6
2002	2601.7	411	79.7	80.1	71.5	74.1	72.3	72.0	7281	83.1
2003	2480.8	411	90.9	80.7	68.7	73.8	68.9	71.8	6663	76.1
2004	2391.6	411	86.8	81.0	66.4	73.5	66.2	71.6	7863	89.5
2005	2231.7	411	90.2	81.4	62.1	72.9	62.0	71.1	7879	89.9
2006	2573.1	411	84.1	81.5	71.3	72.9	71.5	71.1	7217	82.4
2007	2584.1	411	89.8	81.9	71.5	72.8	71.8	71.2	7640	87.2
2008	2793.5	411	85.2	82.0	85.2	73.3	77.4	71.4	7794	88.7
2009	2468.0	411	83.7	82.1	83.7	73.7	68.5	71.3	7538	86.1
2010	2956.7	411	84.7	82.2	84.7	74.1	82.1	71.7	7332	83.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					52	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1331			1026	22	
D. Inspection, maintenance or repair without refuelling				81		
E. Testing of plant systems or components	5			6		
J. Grid limitation, failure or grid unavailability			92			160
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	0
Subtotal	1336	0	92	1113	75	160
Total		1428			1348	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		10
14. Safety Systems		2
15. Reactor Cooling Systems		5
16. Steam generation systems		7
17. Safety I&C Systems (excluding reactor I&C)		0
32. Feedwater and Main Steam System		7
42. Electrical Power Supply Systems		16
Total	0	49

RU-17 KURSK-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP at the beginning of 2010): 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 10000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5640.7 GW(e).h
Energy Availability Factor: 69.5%
Load Factor: 69.6%
Operating Factor: 68.4%
Energy Unavailability Factor: 30.5%
Total Off-line Time: 2769 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	492.8	657.7	700.6	0.0	0.0	503.2	455.4	0.0	640.7	734.6	712.3	743.4	5640.7
EAF (%)	100.0	100.0	99.8	0.6	0.0	75.3	66.4	0.6	94.3	100.0	100.0	100.0	69.5
UCF (%)	100.0	100.0	99.8	0.6	0.0	75.5	67.6	0.6	94.5	100.0	100.0	100.0	69.7
LF (%)	71.6	105.8	101.9	0.0	0.0	75.6	66.2	0.0	96.2	106.6	106.9	108.0	69.6
OF (%)	73.4	100.0	100.0	0.8	0.0	80.0	67.7	2.0	100.0	100.0	100.0	100.0	68.4
EUF (%)	0.0	0.0	0.2	99.4	100.0	24.7	33.6	99.4	5.7	0.0	0.0	0.0	30.5
PUF (%)	0.0	0.0	0.0	99.4	100.0	24.5	0.2	16.1	0.0	0.0	0.0	0.0	20.1
UCLF (%)	0.0	0.0	0.2	0.0	0.0	0.0	32.2	83.3	5.5	0.0	0.0	0.0	10.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.2	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY, FEBRUARY, MARCH, JUNE, SEPTEMBER, OCTOBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 180161 MWH. THE UNIT WAS IN THE OVERHAUL OUTAGE FROM 10.04.01 TO 10.06.05. THE UNIT WAS IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.08.01 TO 10.08.05. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 06 Jan 1972 **Lifetime Generation:** 164706.0 GW(e).h
Date of First Criticality: 25/10/1976 **Cumulative Energy Availability Factor:** 61.0%
Date of Grid Connection: 19/12/1976 **Cumulative Load Factor:** 60.5%
Date of Commercial Operation: 10 Dec 1977 **Cumulative Unit Capability Factor:** 62.9%
Cumulative Energy Unavailability Factor: 39.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	1458.9	925	79.1	79.1	79.1	79.1	71.4	71.4	1897	85.9
1978	5058.1	925	63.0	66.2	63.0	66.2	62.4	64.2	7573	86.4
1979	5930.2	925	73.9	69.7	73.1	69.3	73.2	68.2	7528	85.9
1980	6477.7	925	79.9	72.8	79.7	72.5	79.7	71.8	7669	87.3
1981	6132.8	925	76.4	73.7	76.4	73.4	75.7	72.7	7885	90.0
1982	7010.4	925	85.7	75.9	85.7	75.7	86.5	75.3	7788	88.9
1983	6720.3	925	82.2	76.9	82.2	76.8	82.9	76.5	7456	85.1
1984	6660.0	925	81.4	77.6	81.4	77.4	82.0	77.3	7369	83.9
1985	6346.8	925	76.9	77.5	76.8	77.3	78.3	77.4	7186	82.0
1986	5675.8	925	69.2	76.6	69.2	76.5	70.0	76.6	6598	75.3
1987	7022.7	1000	82.6	77.2	82.6	77.1	80.2	77.0	7407	84.6
1988	6638.0	925	81.7	77.6	81.7	77.5	81.7	77.4	7350	83.7
1989	5745.4	925	68.3	76.9	68.3	76.8	70.9	76.9	6582	75.1
1990	5090.5	925	65.7	76.0	65.7	75.9	62.8	75.8	6817	77.8
1991	4163.1	925	53.5	74.4	52.5	74.3	51.4	74.1	7038	80.3
1992	3669.2	925	46.3	72.6	46.3	72.5	45.2	72.2	6103	69.5
1993	4809.4	925	91.6	73.8	61.8	71.8	59.4	71.4	8145	93.0
1994	1560.6	925	20.6	70.7	19.8	68.8	19.3	68.4	2686	30.7
1995	0.0	925	0.0	66.8	0.0	65.1	0.0	64.7	0	0.0
1996	0.0	925	0.0	63.4	0.0	61.7	0.0	61.3	0	0.0
1997	27.8	925	0.5	60.3	0.5	58.7	0.3	58.3	61	0.7
1998	4508.6	925	59.3	60.2	57.4	58.6	55.6	58.2	7845	89.6
1999	4557.0	925	58.7	60.2	57.6	58.6	56.2	58.1	7464	85.2
2000	3449.7	925	44.3	59.5	43.6	57.9	42.5	57.5	5531	63.0
2001	1296.1	925	16.6	57.7	16.4	56.2	16.0	55.8	2042	23.3
2002	2462.7	925	32.5	56.7	30.8	55.2	30.4	54.8	3439	39.3
2003	6452.7	925	80.2	57.6	78.9	56.1	79.6	55.7	7262	82.9
2004	6601.3	925	83.0	58.6	81.1	57.0	81.2	56.6	7363	83.8
2005	6220.0	925	83.0	59.4	77.0	57.7	76.8	57.3	7651	87.3
2006	5837.7	925	78.4	60.1	72.2	58.2	72.0	57.8	7089	80.9
2007	6736.2	925	89.1	61.0	82.8	59.0	83.1	58.7	7670	87.6
2008	6464.6	925	84.4	61.8	81.4	59.8	79.6	59.3	7596	86.5
2009	7161.2	925	90.3	62.7	89.9	60.7	88.4	60.2	8068	92.1
2010	5640.7	925	69.7	62.9	69.5	61.0	69.6	60.5	5991	68.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		849			70	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	1722			548	1	
D. Inspection, maintenance or repair without refuelling				1608	14	
E. Testing of plant systems or components				5		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				152		
H. Nuclear regulatory requirements					11	
J. Grid limitation, failure or grid unavailability			198		0	5
L. Human factor related					3	
Z. Others					4	
Subtotal	1722	849	198	2313	105	5
Total		2769			2423	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1977 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			0
12. Reactor I&C Systems	849		17
13. Reactor Auxiliary Systems			1
15. Reactor Cooling Systems			14
16. Steam generation systems	0		3
17. Safety I&C Systems (excluding reactor I&C)			3
31. Turbine and auxiliaries			3
32. Feedwater and Main Steam System			9
35. All other I&C Systems			0
41. Main Generator Systems			1
42. Electrical Power Supply Systems			5
Total	849		56

RU-22 KURSK-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP) at the beginning of 2010: 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 10000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7448.7 GW(e).h
Energy Availability Factor: 87.8%
Load Factor: 91.9%
Operating Factor: 92.2%
Energy Unavailability Factor: 12.2%
Total Off-line Time: 684 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	732.0	667.5	735.7	89.6	357.4	676.1	683.1	653.2	695.2	743.2	722.3	693.4	7448.7
EAF (%)	100.0	100.0	100.0	13.9	55.2	99.9	98.5	94.3	99.4	100.0	99.7	92.8	87.8
UCF (%)	100.0	100.0	100.0	13.9	55.2	100.0	100.0	96.0	99.4	100.0	99.7	92.8	88.1
LF (%)	106.4	107.4	107.0	13.5	51.9	101.5	99.3	94.9	104.4	107.8	108.5	100.8	91.9
OF (%)	100.0	100.0	100.0	14.2	91.8	100.0	100.0	100.0	100.0	100.0	100.0	99.3	92.2
EUf (%)	0.0	0.0	0.0	86.1	44.8	0.1	1.5	5.7	0.6	0.0	0.3	7.2	12.2
PUF (%)	0.0	0.0	0.0	86.1	44.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.6	0.0	0.3	7.2	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	1.5	1.7	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 294054 MWH. THE UNIT WAS IN THE IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.04.05 TO 10.05.03. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 01 Jan 1973 **Lifetime Generation:** 162584.0 GW(e).h
Date of First Criticality: 16/12/1978 **Cumulative Energy Availability Factor:** 63.5%
Date of Grid Connection: 28/01/1979 **Cumulative Load Factor:** 63.3%
Date of Commercial Operation: 17/08/1979 **Cumulative Unit Capability Factor:** 65.9%
Cumulative Energy Unavailability Factor: 36.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	2303.9	925	67.7	67.7	67.7	67.7	67.8	67.8	3070	83.6
1980	6404.3	925	79.0	75.7	78.4	75.3	78.8	75.6	7658	87.2
1981	6385.9	925	78.7	76.9	78.7	76.7	78.8	76.9	7874	89.9
1982	5875.8	925	71.1	75.2	71.1	75.1	72.5	75.6	6443	73.6
1983	5707.6	925	70.1	74.1	70.1	73.9	70.4	74.5	7104	81.1
1984	6326.5	925	77.1	74.6	77.1	74.5	77.9	75.1	7219	82.2
1985	6459.9	925	79.4	75.4	79.4	75.3	79.7	75.8	7598	86.7
1986	5617.3	925	69.1	74.5	69.1	74.4	69.3	74.9	6575	75.1
1987	7196.7	1000	83.3	75.6	83.3	75.6	82.2	75.9	7539	86.1
1988	5725.7	925	73.9	75.5	73.9	75.4	70.5	75.3	6609	75.2
1989	6164.2	925	74.9	75.4	74.9	75.3	76.1	75.4	6797	77.6
1990	4789.7	925	62.2	74.3	62.2	74.2	59.1	73.9	6874	78.5
1991	4376.0	925	56.3	72.8	55.3	72.7	54.0	72.4	7361	84.0
1992	2158.4	925	27.2	69.4	27.2	69.3	26.6	69.0	3552	40.4
1993	4438.2	925	85.0	70.5	57.1	68.5	54.8	68.0	7432	84.8
1994	4212.2	925	55.3	69.5	53.5	67.5	52.0	66.9	7385	84.3
1995	4745.4	925	90.8	70.8	59.8	67.0	58.6	66.4	7708	88.0
1996	4196.1	925	52.8	69.8	52.7	66.2	51.6	65.6	7099	80.8
1997	4354.3	925	55.3	69.0	54.9	65.6	53.7	65.0	7076	80.8
1998	1685.1	925	21.7	66.6	21.3	63.3	20.8	62.7	2805	32.0
1999	3708.1	925	48.0	65.7	46.8	62.5	45.8	61.9	6066	69.2
2000	3668.1	925	48.9	64.9	46.2	61.8	45.1	61.1	6211	70.7
2001	4768.1	925	61.1	64.7	60.1	61.7	58.8	61.0	7667	87.5
2002	3027.8	925	38.3	63.6	38.1	60.7	37.4	60.0	4770	54.5
2003	3756.2	925	47.1	62.9	46.4	60.1	46.4	59.4	5834	66.6
2004	3692.1	925	45.1	62.2	45.0	59.5	45.4	58.9	4318	49.2
2005	6896.6	925	87.5	63.2	84.7	60.5	85.1	59.9	7782	88.8
2006	6574.4	925	82.9	63.9	80.3	61.2	81.1	60.6	7320	83.6
2007	5728.7	925	70.0	64.1	69.5	61.5	70.7	61.0	6207	70.9
2008	6835.7	925	82.6	64.7	82.6	62.2	84.1	61.8	7351	83.7
2009	6428.2	925	76.7	65.1	76.6	62.7	79.3	62.4	6778	77.4
2010	7448.7	925	88.1	65.9	87.8	63.5	91.9	63.3	8076	92.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					98	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	679			925		
D. Inspection, maintenance or repair without refuelling				806	18	
E. Testing of plant systems or components				5		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				128		
J. Grid limitation, failure or grid unavailability					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					37	
L. Human factor related					2	
Subtotal	679	0	0	1864	158	0
Total		679			2022	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1979 to 2010 Average Hours Lost Per Year	
11. Reactor and Accessories			51
12. Reactor I&C Systems			9
13. Reactor Auxiliary Systems			6
14. Safety Systems			2
15. Reactor Cooling Systems			14
16. Steam generation systems			3
17. Safety I&C Systems (excluding reactor I&C)			2
32. Feedwater and Main Steam System			4
41. Main Generator Systems			2
42. Electrical Power Supply Systems			1
Total	0		94

RU-38 KURSK-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP at the beginning of 2010): 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 10000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6048.6 GW(e).h
Energy Availability Factor: 71.7%
Load Factor: 74.6%
Operating Factor: 72.5%
Energy Unavailability Factor: 28.3%
Total Off-line Time: 2408 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	736.0	656.7	730.3	699.4	689.8	564.5	0.0	0.0	0.0	635.0	614.6	722.4	6048.6
EAF (%)	100.0	100.0	100.0	100.0	100.0	84.7	0.0	0.0	0.0	89.2	88.4	100.0	71.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	86.1	0.0	0.0	0.0	89.2	88.4	100.0	71.8
LF (%)	106.9	105.6	106.3	105.0	100.2	84.8	0.0	0.0	0.0	92.1	92.3	105.0	74.6
OF (%)	100.0	100.0	100.0	100.0	100.0	87.5	0.0	0.0	0.0	94.8	90.1	100.0	72.5
EUF (%)	0.0	0.0	0.0	0.0	0.0	15.3	100.0	100.0	100.0	10.8	11.6	0.0	28.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	12.8	100.0	100.0	100.0	10.8	0.0	0.0	27.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	11.6	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MAY, OCTOBER, NOVEMBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 224050 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.06.27 TO 10.10.02. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 04 Jan 1978 **Lifetime Generation:** 155398.0 GW(e).h
Date of First Criticality: 08 Sep 1983 **Cumulative Energy Availability Factor:** 71.3%
Date of Grid Connection: 17/10/1983 **Cumulative Load Factor:** 70.7%
Date of Commercial Operation: 30/03/1984 **Cumulative Unit Capability Factor:** 72.5%
Cumulative Energy Unavailability Factor: 28.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	4811.2	925	75.0	75.0	75.0	75.0	70.8	70.8	5800	79.0
1985	6260.8	925	77.9	76.6	77.6	76.4	77.3	74.3	7250	82.8
1986	4810.8	925	60.4	70.9	60.0	70.6	59.4	69.1	6269	71.6
1987	5458.9	1000	69.0	70.4	66.4	69.5	62.3	67.2	6185	70.6
1988	6693.6	925	83.6	73.1	83.6	72.4	82.4	70.3	7471	85.1
1989	5900.5	925	74.3	73.3	74.3	72.7	72.8	70.7	7200	82.2
1990	6889.4	925	86.5	75.2	86.5	74.7	85.0	72.8	8096	92.4
1991	5139.0	925	63.4	73.7	63.2	73.2	63.4	71.6	5704	65.1
1992	6630.5	925	82.1	74.7	82.1	74.2	81.6	72.7	8126	92.5
1993	5562.3	925	71.2	74.3	70.3	73.8	68.6	72.3	6438	73.5
1994	5077.9	925	73.6	74.2	66.7	73.2	62.7	71.4	6495	74.1
1995	5318.1	925	65.7	73.5	65.4	72.5	65.6	70.9	5974	68.2
1996	6739.3	925	82.9	74.3	82.7	73.3	82.9	71.9	7383	84.1
1997	6548.7	925	82.5	74.8	81.6	73.9	80.8	72.5	7325	83.6
1998	4528.3	925	60.3	73.9	56.5	72.7	55.9	71.4	5405	61.7
1999	6006.9	925	75.3	74.0	74.3	72.8	74.1	71.6	6749	77.0
2000	6382.3	925	78.8	74.2	78.3	73.2	78.5	72.0	7415	84.4
2001	3535.2	925	44.7	72.6	43.5	71.5	43.6	70.4	3948	45.1
2002	6699.8	925	88.2	73.4	85.1	72.2	82.7	71.1	7788	88.9
2003	5100.6	925	62.2	72.9	61.8	71.7	62.9	70.6	5469	62.4
2004	6894.2	925	86.3	73.5	84.3	72.3	84.8	71.3	7660	87.2
2005	4987.1	925	63.5	73.1	61.3	71.8	61.5	70.9	5598	63.9
2006	6711.2	925	83.4	73.5	81.9	72.3	82.8	71.4	7353	83.9
2007	5765.3	925	73.7	73.5	71.1	72.2	71.1	71.4	6535	74.6
2008	2117.4	925	26.8	71.6	26.8	70.4	26.1	69.6	2374	27.0
2009	7621.0	925	93.9	72.5	93.8	71.3	94.1	70.5	8216	93.8
2010	6048.6	925	71.8	72.5	71.7	71.3	74.6	70.7	6352	72.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		71			129	
C. Inspection, maintenance or repair combined with refuelling	2338			996		
D. Inspection, maintenance or repair without refuelling				945		
E. Testing of plant systems or components				1		
J. Grid limitation, failure or grid unavailability					1	9
Subtotal	2338	71	0	1942	130	9
Total		2409			2081	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		20
12. Reactor I&C Systems		4
13. Reactor Auxiliary Systems		4
14. Safety Systems		14
15. Reactor Cooling Systems		57
16. Steam generation systems	71	0
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		8
41. Main Generator Systems		1
42. Electrical Power Supply Systems		4
Total	71	118

RU-39 KURSK-4**Operator:** REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")**Contractor:** ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")**1. Station Details**

Type: LWGR
Net Reference Unit Power (RUP at the beginning of 2010): 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 10000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7557.1 GW(e).h
Energy Availability Factor: 91.3%
Load Factor: 93.3%
Operating Factor: 92.6%
Energy Unavailability Factor: 8.7%
Total Off-line Time: 651 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	710.5	632.2	699.4	668.6	659.5	199.0	675.7	685.6	690.4	621.6	698.5	616.2	7557.1
EAF (%)	100.0	100.0	99.9	99.6	97.7	31.0	97.7	98.6	100.0	86.5	100.0	84.4	91.3
UCF (%)	100.0	100.0	99.9	99.6	97.7	31.4	100.0	100.0	100.0	86.5	100.0	84.4	91.7
LF (%)	103.2	101.7	101.8	100.4	95.8	29.9	98.2	99.6	103.7	90.2	104.9	89.5	93.3
OF (%)	100.0	100.0	100.0	100.0	100.0	35.1	100.0	100.0	100.0	88.9	100.0	86.4	92.6
EUF (%)	0.0	0.0	0.1	0.4	2.3	69.0	2.3	1.4	0.0	13.5	0.0	15.6	8.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	68.4	0.0	0.0	0.0	0.0	0.0	0.0	5.6
UCLF (%)	0.0	0.0	0.1	0.4	2.3	0.2	0.0	0.0	0.0	13.5	0.0	15.6	2.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	2.3	1.4	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - APRIL, JUNE, AUGUST - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 135112 MWH. THE UNIT WAS IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.06.03 TO 10.06.24. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 05 Jan 1981 **Lifetime Generation:** 153450.0 GW(e).h
Date of First Criticality: 31/10/1985 **Cumulative Energy Availability Factor:** 75.5%
Date of Grid Connection: 12 Feb 1985 **Cumulative Load Factor:** 75.6%
Date of Commercial Operation: 02 May 1986 **Cumulative Unit Capability Factor:** 76.7%
Cumulative Energy Unavailability Factor: 24.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	5952.3	925	80.8	80.8	80.4	80.4	80.3	80.3	7059	88.1
1987	6167.7	1000	72.4	76.3	72.3	76.0	70.4	74.9	6704	76.5
1988	6653.0	925	81.7	78.1	81.7	77.9	81.9	77.3	7390	84.1
1989	6131.8	925	76.0	77.6	76.0	77.4	75.7	76.9	6954	79.4
1990	6050.0	925	73.7	76.8	73.6	76.7	74.7	76.4	6922	79.0
1991	7356.1	925	92.5	79.4	90.3	78.9	90.8	78.8	8469	96.7
1992	6117.4	925	75.4	78.9	75.4	78.4	75.3	78.3	7324	83.4
1993	5638.3	925	71.7	78.0	71.0	77.5	69.6	77.2	6439	73.5
1994	5369.4	925	71.5	77.3	67.0	76.3	66.3	76.0	6255	71.4
1995	6207.5	925	78.6	77.4	77.0	76.4	76.6	76.1	7001	79.9
1996	6590.2	925	81.4	77.8	80.2	76.7	81.1	76.5	7373	83.9
1997	5971.7	925	73.9	77.4	73.1	76.4	73.7	76.3	6664	76.1
1998	6641.4	925	86.7	78.1	82.3	76.9	82.0	76.7	7751	88.5
1999	5895.4	925	74.2	77.9	72.8	76.6	72.8	76.4	6595	75.3
2000	6778.8	925	83.5	78.2	82.8	77.0	83.4	76.9	7423	84.5
2001	6671.6	925	82.2	78.5	81.5	77.3	82.3	77.2	7281	83.1
2002	5531.0	925	68.3	77.9	67.6	76.7	68.3	76.7	6094	69.6
2003	6233.4	925	77.3	77.8	75.8	76.7	76.9	76.7	6802	77.6
2004	5422.9	925	68.0	77.3	66.7	76.1	66.7	76.2	6005	68.4
2005	7081.1	925	89.4	77.9	87.1	76.7	87.4	76.8	7858	89.7
2006	3636.4	925	44.8	76.4	44.2	75.2	44.9	75.2	4115	47.0
2007	7426.5	925	94.3	77.2	91.2	75.9	91.7	76.0	8298	94.7
2008	6052.4	925	74.9	77.1	73.9	75.8	74.5	75.9	6580	74.9
2009	4184.3	925	52.5	76.0	52.3	74.8	51.6	74.9	4786	54.6
2010	7557.1	925	91.7	76.7	91.3	75.5	93.3	75.6	8109	92.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		185			48	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	468			1083		
D. Inspection, maintenance or repair without refuelling				563		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				109		
J. Grid limitation, failure or grid unavailability					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Subtotal	468	185	0	1755	60	0
Total		653			1815	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems	185	1
15. Reactor Cooling Systems		12
16. Steam generation systems	0	
32. Feedwater and Main Steam System		9
42. Electrical Power Supply Systems		22
Total	185	46

RU-15 LENINGRAD-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
 Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
 Net Reference Unit Power (RUP) at the beginning of 2010: 925.0 MW(e)
 Design Net Capacity: 925.0 MW(e)
 Design Discharge Burnup: 22000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6345.2 GW(e).h
 Energy Availability Factor: 78.2%
 Load Factor: 78.3%
 Operating Factor: 78.9%
 Energy Unavailability Factor: 21.8%
 Total Off-line Time: 1848 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	645.1	618.9	690.9	676.8	671.2	37.2	0.0	217.6	688.3	704.1	681.5	713.6	6345.2
EAF (%)	99.1	98.9	99.7	100.0	99.2	5.9	0.0	37.8	100.0	99.8	99.3	100.0	78.2
UCF (%)	99.1	98.9	99.7	100.0	99.2	5.9	0.0	38.3	100.0	99.8	99.3	100.0	78.2
LF (%)	93.7	99.6	100.5	101.6	97.5	5.6	0.0	31.6	103.4	102.2	102.3	103.7	78.3
OF (%)	100.0	100.0	100.0	100.0	100.0	6.8	0.0	41.8	100.0	100.0	100.0	100.0	78.9
EUF (%)	0.9	1.1	0.3	0.0	0.8	94.1	100.0	62.2	0.0	0.2	0.7	0.0	21.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	94.1	100.0	5.6	0.0	0.0	0.0	0.0	16.7
UCLF (%)	0.9	1.1	0.3	0.0	0.8	0.0	0.0	56.1	0.0	0.2	0.7	0.0	5.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - JUNE, AUGUST, SEPTEMBER, OCTOBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 118993 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.06.03 TO 10.08.02. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 03 Jan 1970 Lifetime Generation: 208153.0 GW(e).h
 Date of First Criticality: 09 Dec 1973 Cumulative Energy Availability Factor: 70.5%
 Date of Grid Connection: 21/12/1973 Cumulative Load Factor: 70.1%
 Date of Commercial Operation: 11 Jan 1974 Cumulative Unit Capability Factor: 71.2%
 Cumulative Energy Unavailability Factor: 29.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1022.6	925	76.5	76.5	76.5	76.5	75.5	75.5	1378	94.1
1975	3998.9	925	50.6	54.3	50.6	54.3	49.4	53.1	6661	76.0
1976	4098.2	925	51.5	53.0	51.5	53.0	50.4	51.9	6137	69.9
1977	5941.8	925	74.1	59.7	74.1	59.7	73.3	58.6	8192	93.5
1978	5413.7	925	67.3	61.5	67.3	61.5	66.8	60.6	6735	76.9
1979	6322.0	925	78.7	64.8	78.7	64.8	78.0	64.0	7973	91.0
1980	5542.1	925	68.5	65.4	68.3	65.4	68.2	64.7	6574	74.8
1981	6414.7	925	79.8	67.4	79.5	67.4	79.2	66.7	8018	91.5
1982	5709.6	925	70.8	67.8	70.8	67.8	70.5	67.1	6665	76.1
1983	7164.8	925	88.0	70.0	87.5	69.9	88.4	69.5	7803	89.1
1984	6650.1	925	82.0	71.2	81.7	71.1	81.8	70.7	7321	83.3
1985	7008.1	925	86.5	72.6	86.3	72.5	86.5	72.1	8059	92.0
1986	5924.1	925	73.3	72.6	73.3	72.5	73.1	72.2	6677	76.2
1987	8113.0	1000	93.5	74.3	92.7	74.2	92.6	73.8	8255	94.2
1988	6620.3	925	81.7	74.9	81.7	74.7	81.5	74.4	7519	85.6
1989	4577.0	925	56.4	73.6	56.0	73.5	56.5	73.2	4993	57.0
1990	0.0	925	0.0	69.1	0.0	69.0	0.0	68.7	0	0.0
1991	3934.0	925	49.9	68.0	49.9	67.8	48.5	67.5	6385	72.9
1992	7191.6	925	88.6	69.1	88.1	69.0	88.5	68.7	7995	91.0
1993	6520.4	925	83.5	69.9	81.7	69.6	80.5	69.3	7354	83.9
1994	5531.2	925	77.7	70.3	77.6	70.0	68.3	69.3	6956	79.4
1995	0.0	925	0.0	67.0	0.0	66.7	0.0	66.0	0	0.0
1996	3852.8	925	47.6	66.1	47.5	65.9	47.4	65.2	4454	50.7
1997	6872.4	925	88.6	67.1	86.1	66.7	84.8	66.0	7785	88.9
1998	5630.3	925	69.8	67.2	68.8	66.8	69.5	66.1	6220	71.0
1999	6637.9	925	81.8	67.7	81.3	67.4	81.9	66.8	7431	84.8
2000	6317.8	925	78.5	68.2	77.2	67.8	77.8	67.2	7069	80.5
2001	7097.8	925	89.2	68.9	87.4	68.5	87.6	67.9	7923	90.4
2002	5824.6	925	72.4	69.1	71.2	68.6	71.9	68.1	7104	81.1
2003	7446.3	925	95.0	69.9	92.2	69.4	91.9	68.9	8495	97.0
2004	1328.5	925	18.2	68.2	16.7	67.6	16.4	67.2	1715	19.5
2005	7145.4	925	93.5	69.0	88.5	68.3	88.2	67.8	8255	94.2
2006	6802.1	925	83.9	69.5	83.9	68.8	83.9	68.3	7651	87.3
2007	7538.3	925	93.1	70.2	92.0	69.5	93.0	69.1	8306	94.8
2008	5848.7	925	72.6	70.3	72.6	69.6	72.0	69.2	6421	73.1
2009	7616.0	925	95.3	71.0	95.1	70.3	94.0	69.9	8385	95.7
2010	6345.2	925	78.2	71.2	78.2	70.5	78.3	70.1	6912	78.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		480			101	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1440			990		
D. Inspection, maintenance or repair without refuelling				652	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				7	16	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				183		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	
L. Human factor related					1	
Subtotal	1440	480	0	1832	131	0
Total		1920			1963	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1974 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories	130		
12. Reactor I&C Systems			17
14. Safety Systems			7
15. Reactor Cooling Systems			31
17. Safety I&C Systems (excluding reactor I&C)			1
21. Fuel Handling and Storage Facilities			1
31. Turbine and auxiliaries	350		2
32. Feedwater and Main Steam System			4
35. All other I&C Systems			2
41. Main Generator Systems			2
42. Electrical Power Supply Systems			2
Total	480		69

RU-16 LENINGRAD-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP at the beginning of 2010): 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 22000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6434.7 GW(e).h
Energy Availability Factor: 79.6%
Load Factor: 79.4%
Operating Factor: 83.9%
Energy Unavailability Factor: 20.4%
Total Off-line Time: 1408 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	668.4	629.9	691.8	660.2	669.2	645.2	651.5	617.0	0.0	14.4	474.6	712.4	6434.7
EAF (%)	96.5	99.1	99.3	97.9	98.8	97.0	94.7	98.3	0.0	3.4	71.3	99.8	79.6
UCF (%)	96.5	99.1	99.3	97.9	98.8	97.8	96.6	99.4	0.0	3.4	71.3	99.8	80.0
LF (%)	97.1	101.3	100.7	99.1	97.2	96.9	94.7	89.7	0.0	2.1	71.3	103.5	79.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	7.7	100.0	100.0	83.9
EUf (%)	3.5	0.9	0.7	2.1	1.2	3.0	5.3	1.7	100.0	96.6	28.7	0.2	20.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	100.0	95.0	0.0	0.0	16.3
UCLF (%)	3.5	0.9	0.7	2.1	1.2	2.2	3.4	0.4	0.0	1.6	28.7	0.2	3.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.8	1.9	1.2	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - AUGUST, NOVEMBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 74762 MWH. THE UNIT WAS IN THE OVERHAUL MAINTENANCE OUTAGE FROM 10.09.01 TO 10.10.29. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 06 Jan 1970 **Lifetime Generation:** 201200.0 GW(e).h
Date of First Criticality: 05 Jun 1975 **Cumulative Energy Availability Factor:** 70.7%
Date of Grid Connection: 07 Nov 1975 **Cumulative Load Factor:** 70.3%
Date of Commercial Operation: 02 Nov 1976 **Cumulative Unit Capability Factor:** 71.5%
Cumulative Energy Unavailability Factor: 29.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	4873.3	925	67.9	67.9	67.9	67.9	65.5	65.5	6910	85.9
1977	5413.7	925	67.2	67.5	67.1	67.5	66.8	66.2	7337	83.8
1978	6310.8	925	78.8	71.4	78.8	71.3	77.9	70.2	8008	91.4
1979	5633.7	925	70.1	71.0	70.1	71.0	69.5	70.0	6954	79.4
1980	6351.8	925	78.8	72.6	78.6	72.6	78.2	71.7	7960	90.6
1981	5177.2	925	62.0	70.8	62.0	70.8	63.9	70.4	6057	69.1
1982	7266.8	925	90.4	73.7	89.9	73.5	89.7	73.2	8125	92.8
1983	6790.8	925	84.2	75.0	83.6	74.8	83.8	74.5	7479	85.4
1984	7145.9	925	87.6	76.4	87.4	76.2	87.9	76.0	7881	89.7
1985	5962.6	925	74.4	76.2	74.3	76.0	73.6	75.8	6604	75.4
1986	7152.3	925	88.4	77.3	88.1	77.1	88.3	76.9	7914	90.3
1987	7228.2	1000	83.7	77.9	83.0	77.7	82.5	77.4	7513	85.8
1988	6814.9	925	83.6	78.3	83.6	78.1	83.9	77.9	7417	84.4
1989	6111.5	925	75.8	78.2	75.6	77.9	75.4	77.7	7102	81.1
1990	5998.3	925	75.5	78.0	75.3	77.8	74.0	77.5	8125	92.8
1991	4410.8	925	56.4	76.6	56.3	76.4	54.4	76.1	7204	82.2
1992	0.0	925	0.0	72.1	0.0	71.9	0.0	71.6	0	0.0
1993	0.0	925	0.0	68.1	0.0	67.9	0.0	67.6	0	0.0
1994	164.1	925	2.3	64.6	2.3	64.5	2.0	64.1	660	7.5
1995	6812.0	925	93.4	66.1	86.2	65.6	84.1	65.1	8280	94.5
1996	7244.9	925	89.4	67.2	89.1	66.7	89.2	66.3	7922	90.2
1997	6587.1	925	83.1	67.9	82.6	67.4	81.3	67.0	7342	83.8
1998	5916.7	925	73.4	68.2	72.5	67.6	73.0	67.2	6643	75.8
1999	6557.8	925	80.6	68.7	80.2	68.1	80.9	67.8	7299	83.3
2000	7252.5	925	90.1	69.5	88.6	69.0	89.3	68.7	7972	90.8
2001	7073.5	925	88.5	70.3	86.6	69.6	87.3	69.4	7904	90.2
2002	7024.9	925	88.7	70.9	86.6	70.3	86.7	70.0	7961	90.9
2003	7134.4	925	90.9	71.7	88.0	70.9	88.0	70.7	8298	94.7
2004	6711.5	925	86.4	72.2	82.9	71.3	82.6	71.1	7832	89.2
2005	3763.2	925	50.1	71.4	46.6	70.5	46.4	70.3	4557	52.0
2006	1461.4	925	18.1	69.7	18.1	68.8	18.0	68.6	1760	20.1
2007	6461.4	925	80.1	70.0	79.0	69.1	79.7	68.9	7077	80.8
2008	7017.5	925	88.3	70.6	88.1	69.7	86.4	69.5	7810	88.9
2009	7278.6	925	93.8	71.3	93.4	70.4	89.8	70.0	8310	94.9
2010	6434.7	925	80.0	71.5	79.6	70.7	79.4	70.3	7352	83.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					75	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	1407			698		
D. Inspection, maintenance or repair without refuelling				913	8	
E. Testing of plant systems or components				3	1	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				315		
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	1407	0	0	1929	87	1
Total		1407			2017	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		8
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		6
15. Reactor Cooling Systems		17
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System		2
35. All other I&C Systems		1
42. Electrical Power Supply Systems		4
Total	0	50

RU-34 LENINGRAD-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUF at the beginning of 2010: 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 22000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7303.2 GW(e).h
Energy Availability Factor: 92.6%
Load Factor: 90.1%
Operating Factor: 94.3%
Energy Unavailability Factor: 7.4%
Total Off-line Time: 499 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	690.0	621.4	678.2	605.1	129.3	623.2	638.0	623.0	601.9	702.6	683.8	706.7	7303.2
EAF (%)	100.0	98.4	97.8	100.0	35.5	94.3	93.8	96.7	96.6	99.7	100.0	99.4	92.6
UCF (%)	100.0	98.4	97.8	100.0	35.5	94.5	95.5	97.8	97.2	99.7	100.0	99.4	92.9
LF (%)	100.3	100.0	98.7	90.9	18.8	93.6	92.7	90.5	90.4	102.0	102.7	102.7	90.1
OF (%)	100.0	100.0	100.0	100.0	35.6	97.2	100.0	100.0	100.0	100.0	100.0	100.0	94.3
EUF (%)	0.0	1.6	2.2	0.0	64.5	5.7	6.2	3.3	3.4	0.3	0.0	0.6	7.4
PUF (%)	0.0	0.0	0.0	0.0	64.5	5.5	0.0	0.0	0.0	0.0	0.0	0.0	5.9
UCLF (%)	0.0	1.6	2.2	0.0	0.1	0.1	4.5	2.2	2.8	0.3	0.0	0.6	1.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.2	1.7	1.1	0.5	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - APRIL, JUNE - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 120036 MWH. THE UNIT WAS IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.05.12 TO 10.06.01. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 12 Jan 1973 **Lifetime Generation:** 173254.0 GW(e).h
Date of First Criticality: 17/09/1979 **Cumulative Energy Availability Factor:** 70.1%
Date of Grid Connection: 12 Jul 1979 **Cumulative Load Factor:** 68.8%
Date of Commercial Operation: 29/06/1980 **Cumulative Unit Capability Factor:** 71.2%
Cumulative Energy Unavailability Factor: 29.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	3623.6	925	77.4	77.4	77.4	77.4	76.3	76.3	4488	87.4
1981	6553.6	925	81.7	80.1	81.3	79.9	80.9	79.2	7528	85.9
1982	6413.3	925	80.8	80.4	80.3	80.0	79.1	79.2	7448	85.0
1983	5708.4	925	71.3	77.8	70.9	77.5	70.4	76.7	6809	77.7
1984	7214.9	925	89.8	80.4	89.2	80.1	88.8	79.4	8060	91.8
1985	6831.9	925	85.4	81.3	84.9	80.9	84.3	80.3	7835	89.4
1986	6890.9	925	86.4	82.1	85.9	81.7	85.0	81.0	7935	90.6
1987	6010.3	1000	70.4	80.5	69.4	79.9	68.6	79.2	6362	72.6
1988	6951.7	925	86.5	81.2	86.5	80.7	85.6	80.0	7885	89.8
1989	6938.1	925	86.2	81.7	85.9	81.2	85.6	80.6	7455	85.1
1990	7531.9	925	93.0	82.7	92.4	82.3	93.0	81.7	8280	94.5
1991	6506.6	925	80.6	82.6	80.6	82.1	80.3	81.6	7197	82.2
1992	5516.6	925	68.5	81.4	68.4	81.0	67.9	80.5	6122	69.7
1993	7143.8	925	90.1	82.1	88.9	81.6	88.2	81.1	7966	90.9
1994	6631.8	925	92.4	82.8	91.0	82.3	81.8	81.1	8135	92.9
1995	3586.0	925	49.4	80.7	46.5	80.0	44.3	78.8	4332	49.5
1996	0.0	925	0.0	75.8	0.0	75.2	0.0	74.0	0	0.0
1997	0.0	925	0.0	71.5	0.0	70.9	0.0	69.8	0	0.0
1998	1386.5	925	17.5	68.6	17.4	68.1	17.1	67.0	1610	18.4
1999	7853.1	925	99.7	70.2	97.1	69.5	96.9	68.5	8701	99.3
2000	6352.8	925	79.6	70.7	78.2	70.0	78.2	69.0	7169	81.6
2001	6173.5	925	78.9	71.0	76.6	70.3	76.2	69.3	7007	80.0
2002	2514.7	925	33.6	69.4	31.9	68.6	31.0	67.7	3332	38.0
2003	6729.2	925	86.6	70.1	84.5	69.2	83.0	68.3	8100	92.5
2004	6909.1	925	90.9	71.0	86.5	69.9	85.0	69.0	8426	95.9
2005	4447.3	925	61.5	70.6	61.1	69.6	54.9	68.4	5397	61.6
2006	7332.1	925	89.9	71.3	89.9	70.4	90.5	69.3	8274	94.5
2007	3756.0	925	54.1	70.7	47.0	69.5	46.4	68.4	4820	55.0
2008	5013.6	925	62.7	70.4	62.7	69.3	61.7	68.2	5632	64.1
2009	5336.1	925	70.6	70.4	70.4	69.3	65.9	68.1	6209	70.9
2010	7303.2	925	92.9	71.2	92.6	70.1	90.1	68.8	8261	94.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					113	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	499			613		
D. Inspection, maintenance or repair without refuelling				1231		
E. Testing of plant systems or components					21	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				169		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				103		
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	6
L. Human factor related					1	
Subtotal	499	0	0	2116	139	7
Total		499			2262	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1980 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		10
12. Reactor I&C Systems		2
14. Safety Systems		1
15. Reactor Cooling Systems		7
16. Steam generation systems		1
17. Safety I&C Systems (excluding reactor I&C)		7
31. Turbine and auxiliaries		62
32. Feedwater and Main Steam System		4
41. Main Generator Systems		2
42. Electrical Power Supply Systems		11
Total	0	107

RU-35 LENINGRAD-4

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
Net Reference Unit Power (RUP)
at the beginning of 2010: 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 22000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5222.4 GW(e).h
Energy Availability Factor: 64.0%
Load Factor: 64.4%
Operating Factor: 66.2%
Energy Unavailability Factor: 36.0%
Total Off-line Time: 2962 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	53.4	578.1	593.4	677.7	551.0	663.6	700.6	691.3	713.2	5222.4
EAF (%)	0.0	0.0	0.0	10.1	83.9	89.4	99.2	84.1	99.7	98.7	99.6	98.8	64.0
UCF (%)	0.0	0.0	0.0	10.1	83.9	89.5	99.9	84.8	99.9	98.7	99.6	98.8	64.2
LF (%)	0.0	0.0	0.0	8.0	84.0	89.1	98.5	80.1	99.6	101.7	103.8	103.6	64.4
OF (%)	0.0	0.0	0.0	21.8	89.5	90.8	100.0	87.1	100.0	100.0	100.0	100.0	66.2
EUF (%)	100.0	100.0	100.0	89.9	16.1	10.6	0.8	15.9	0.3	1.3	0.4	1.2	36.0
PUF (%)	100.0	100.0	100.0	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2
UCLF (%)	0.0	0.0	0.0	70.8	16.1	10.5	0.1	15.2	0.1	1.3	0.4	1.2	9.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.7	0.2	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN MAY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 126768 MWH. THE UNIT WAS IN THE OVERHAUL OUTAGE FROM 10.01.01 TO 10.04.06. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 02 Jan 1975
Date of First Criticality: 29/12/1980
Date of Grid Connection: 02 Sep 1981
Date of Commercial Operation: 29/08/1981

Lifetime Generation: 170151.0 GW(e).h
Cumulative Energy Availability Factor: 71.6%
Cumulative Load Factor: 70.5%
Cumulative Unit Capability Factor: 72.8%
Cumulative Energy Unavailability Factor: 28.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	2582.8	925	76.9	76.9	76.9	76.9	76.0	76.0	3169	86.3
1982	6715.2	925	83.7	81.7	83.6	81.6	82.9	80.8	7609	86.9
1983	6844.2	925	86.1	83.5	85.3	83.1	84.5	82.3	8159	93.1
1984	6126.3	925	74.9	81.0	74.4	80.6	75.4	80.3	6803	77.4
1985	7335.3	925	91.2	83.3	90.9	82.9	90.5	82.6	8309	94.9
1986	7060.9	925	88.7	84.3	87.6	83.8	87.1	83.5	7826	89.3
1987	7319.2	1000	85.0	84.4	84.1	83.9	83.6	83.5	7530	86.0
1988	6050.4	925	74.8	83.1	74.8	82.6	74.5	82.3	6667	75.9
1989	7409.7	925	91.9	84.2	91.5	83.7	91.4	83.3	8185	93.4
1990	7762.6	925	96.1	85.4	95.4	84.9	95.8	84.7	8588	98.0
1991	6130.7	925	76.8	84.6	76.1	84.1	75.7	83.8	6870	78.4
1992	5618.1	925	70.8	83.4	70.3	82.9	69.2	82.5	6617	75.3
1993	6735.7	925	87.6	83.7	85.3	83.1	83.1	82.6	7762	88.6
1994	6167.1	925	83.2	83.7	82.1	83.0	76.1	82.1	7340	83.8
1995	6141.0	925	86.1	83.9	83.0	83.0	75.8	81.7	7270	83.0
1996	7079.7	925	88.8	84.2	88.3	83.3	87.1	82.0	8048	91.6
1997	7644.7	925	98.2	85.0	95.9	84.1	94.3	82.8	8760	100.0
1998	3682.0	925	47.3	82.9	46.0	81.9	45.4	80.6	4341	49.6
1999	0.0	925	0.0	78.4	0.0	77.5	0.0	76.3	0	0.0
2000	0.0	925	0.0	74.4	0.0	73.5	0.0	72.4	0	0.0
2001	3585.7	925	45.5	73.0	44.6	72.1	44.3	71.0	4387	50.1
2002	7528.5	925	97.6	74.1	93.9	73.1	92.9	72.0	8760	100.0
2003	1957.2	925	26.0	72.0	24.7	71.0	24.2	69.9	2399	27.4
2004	7232.2	925	92.3	72.8	89.6	71.8	89.0	70.7	8243	93.8
2005	6730.1	925	89.3	73.5	83.8	72.3	83.0	71.2	7838	89.5
2006	5611.9	925	69.4	73.3	69.4	72.1	69.3	71.1	6197	70.7
2007	4827.4	925	64.8	73.0	59.7	71.7	59.6	70.7	5713	65.2
2008	7526.2	925	94.9	73.8	94.7	72.5	92.6	71.5	8714	99.2
2009	4052.8	925	53.4	73.1	53.2	71.8	50.0	70.7	4695	53.6
2010	5222.4	925	64.2	72.8	64.0	71.6	64.4	70.5	5798	66.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		667			51	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	2296			1282		
D. Inspection, maintenance or repair without refuelling				280		
E. Testing of plant systems or components					0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				212		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				134	46	
J. Grid limitation, failure or grid unavailability					1	10
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					25	1
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					0	
Subtotal	2296	667	0	1908	123	11
Total		2963			2042	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems	505	2
15. Reactor Cooling Systems	66	19
16. Steam generation systems		3
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries	96	8
32. Feedwater and Main Steam System	0	5
41. Main Generator Systems		2
42. Electrical Power Supply Systems		8
Total	667	48

RU-9 NOVovorONEZH-3

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 385.0 MW(e)
Design Net Capacity: 385.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2467.3 GW(e).h
Energy Availability Factor: 74.2%
Load Factor: 73.2%
Operating Factor: 88.4%
Energy Unavailability Factor: 25.8%
Total Off-line Time: 1014 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	250.0	207.8	199.7	184.6	188.7	9.8	77.0	238.4	261.5	281.8	276.8	291.4	2467.3
EAF (%)	88.1	81.6	71.7	68.7	68.1	7.0	29.2	83.7	94.8	98.4	99.2	100.0	74.2
UCF (%)	88.1	81.6	71.7	68.9	72.2	7.5	30.6	88.0	98.4	98.4	99.9	100.0	75.5
LF (%)	87.3	80.3	69.8	66.6	65.9	3.5	26.9	83.2	94.3	98.2	99.8	101.7	73.2
OF (%)	100.0	100.0	100.0	100.0	100.0	7.1	56.6	97.0	100.0	100.0	100.0	100.0	88.4
EUf (%)	11.9	18.4	28.3	31.3	31.9	93.0	70.8	16.3	5.2	1.6	0.8	0.0	25.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	89.7	50.2	0.3	0.0	0.0	0.0	0.0	11.7
UCLF (%)	11.9	18.4	28.3	31.1	27.8	2.9	19.2	11.8	1.6	1.6	0.1	0.0	12.9
XUF (%)	0.0	0.0	0.0	0.2	4.1	0.5	1.4	4.3	3.6	0.0	0.7	0.0	1.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN NOVEMBER, DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 7371 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.06.04 TO 10.07.14. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 07 Jan 1967
Date of First Criticality: 22/12/1971
Date of Grid Connection: 27/12/1971
Date of Commercial Operation: 29/06/1972

Lifetime Generation: 91805.0 GW(e).h
Cumulative Energy Availability Factor: 70.7%
Cumulative Load Factor: 69.8%
Cumulative Unit Capability Factor: 71.4%
Cumulative Energy Unavailability Factor: 29.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	1319.4	385	76.7	76.7	76.7	76.7	66.7	66.7	4397	85.6
1973	1877.2	385	57.9	64.8	57.9	64.8	55.7	59.7	7114	81.2
1974	2630.0	385	79.0	70.3	79.0	70.3	78.0	66.8	7990	91.2
1975	1967.9	385	58.0	66.9	58.0	66.9	58.4	64.4	6695	76.4
1976	2221.4	385	66.6	66.8	66.6	66.8	65.7	64.7	7534	85.8
1977	2786.3	385	82.1	69.6	82.1	69.6	82.6	67.9	7851	89.6
1978	2903.8	385	85.8	72.0	85.8	72.0	86.1	70.7	7962	90.9
1979	2632.9	385	77.9	72.8	77.9	72.8	78.1	71.7	7477	85.4
1980	2844.6	385	84.2	74.1	84.2	74.1	84.3	73.1	8246	94.1
1981	2827.2	385	84.0	75.1	84.0	75.1	83.8	74.2	7934	90.6
1982	2770.5	385	82.6	75.8	82.6	75.8	82.1	75.0	8037	91.7
1983	2470.0	385	74.1	75.7	74.1	75.7	73.2	74.8	7158	81.7
1984	3056.5	385	89.8	76.8	89.8	76.8	90.4	76.1	8185	93.2
1985	3003.8	385	88.9	77.7	88.9	77.7	89.1	77.0	8195	93.6
1986	2705.5	385	80.5	77.9	80.5	77.9	80.2	77.3	8048	91.9
1987	2321.9	417	66.5	77.1	66.5	77.1	63.6	76.3	6361	72.6
1988	2906.1	385	91.0	77.9	91.0	77.9	85.9	76.9	8110	92.3
1989	1984.6	385	66.0	77.3	66.0	77.3	58.8	75.9	6040	68.9
1990	2767.4	385	85.6	77.7	84.4	77.7	82.1	76.2	8611	98.3
1991	1614.0	385	49.2	76.3	48.7	76.2	47.9	74.8	5176	59.1
1992	2580.4	385	76.9	76.3	76.2	76.2	76.3	74.8	6991	79.6
1993	1810.5	385	53.8	75.3	53.0	75.1	53.7	73.9	4991	57.0
1994	2714.6	385	82.0	75.6	79.1	75.3	80.5	74.1	7300	83.3
1995	1364.0	385	41.3	74.1	40.6	73.8	40.4	72.7	3945	45.0
1996	1947.0	385	58.8	73.5	57.1	73.1	57.6	72.1	5510	62.7
1997	2624.0	385	79.7	73.7	77.4	73.3	77.8	72.3	7075	80.8
1998	2535.6	385	76.4	73.8	74.3	73.3	75.2	72.4	6822	77.9
1999	1919.3	385	61.4	73.4	57.1	72.8	56.9	71.9	5669	64.7
2000	2621.5	385	79.8	73.6	77.2	72.9	77.5	72.1	7131	81.2
2001	1293.4	385	38.5	72.4	38.2	71.7	38.3	70.9	3529	40.3
2002	2431.9	385	72.6	72.4	71.9	71.7	72.1	71.0	6415	73.2
2003	2335.0	385	69.6	72.3	68.9	71.7	69.2	70.9	6236	71.2
2004	2313.6	385	71.3	72.3	69.7	71.6	68.4	70.8	7282	82.9
2005	2472.1	385	75.7	72.4	74.2	71.7	73.3	70.9	7233	82.6
2006	2684.0	385	82.5	72.7	80.1	71.9	79.6	71.2	7621	87.0
2007	1713.5	385	52.4	72.1	52.3	71.4	50.8	70.6	6153	70.2
2008	1866.6	385	58.2	71.7	57.2	71.0	55.2	70.2	7584	86.3
2009	1835.5	385	56.1	71.3	55.3	70.6	54.4	69.8	5295	60.4
2010	2467.3	385	75.5	71.4	74.2	70.7	73.2	69.8	7746	88.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		22			199	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	971			1420	6	
D. Inspection, maintenance or repair without refuelling				133		
J. Grid limitation, failure or grid unavailability			21			1
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					5	
Z. Others					5	
Subtotal	971	22	21	1553	215	1
Total		1014			1769	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1972 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		42
12. Reactor I&C Systems		13
15. Reactor Cooling Systems		1
16. Steam generation systems		103
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		12
35. All other I&C Systems		0
41. Main Generator Systems		0
42. Electrical Power Supply Systems	22	1
Total	22	173

RU-11 NOVOVORONEZH-4

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 385.0 MW(e)
Design Net Capacity: 385.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2928.7 GW(e).h
Energy Availability Factor: 85.8%
Load Factor: 86.8%
Operating Factor: 88.2%
Energy Unavailability Factor: 14.2%
Total Off-line Time: 1033 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	301.8	233.1	300.9	271.0	278.3	259.6	264.5	74.0	97.8	287.4	273.8	286.6	2928.7
EAF (%)	100.0	85.6	100.0	97.2	96.8	94.0	92.8	27.3	36.7	100.0	98.9	100.0	85.8
UCF (%)	100.0	85.6	100.0	97.4	99.9	100.0	99.5	29.5	37.2	100.0	100.0	100.0	87.5
LF (%)	105.4	90.1	105.2	97.8	97.2	93.7	92.3	25.8	35.3	100.2	98.8	100.0	86.8
OF (%)	100.0	86.2	100.0	100.0	100.0	100.0	100.0	29.7	42.1	100.0	100.0	100.0	88.2
EUf (%)	0.0	14.4	0.0	2.8	3.2	6.0	7.2	72.7	63.3	0.0	1.1	0.0	14.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	70.5	42.6	0.0	0.0	0.0	9.5
UCLF (%)	0.0	14.4	0.0	2.6	0.1	0.0	0.5	0.0	20.2	0.0	0.1	0.0	3.0
XUF (%)	0.0	0.0	0.0	0.2	3.1	6.0	6.7	2.2	0.5	0.0	1.1	0.0	1.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NNPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MARCH, OCTOBER - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 41209 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.08.10 TO 10.09.12. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION

5. Historical Summary

Date of Construction Start: 07 Jan 1967 **Lifetime Generation:** 99612.0 GW(e).h
Date of First Criticality: 25/12/1972 **Cumulative Energy Availability Factor:** 77.9%
Date of Grid Connection: 28/12/1972 **Cumulative Load Factor:** 77.6%
Date of Commercial Operation: 24/03/1973 **Cumulative Unit Capability Factor:** 79.4%
Cumulative Energy Unavailability Factor: 22.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	2360.2	385	85.8	85.8	85.8	85.8	83.5	83.5	6838	93.1
1974	2411.8	385	71.3	77.9	71.3	77.9	71.5	77.0	7159	81.7
1975	2644.9	385	75.6	77.1	75.6	77.1	78.4	77.5	7950	90.8
1976	2924.1	385	84.5	79.0	84.5	79.0	86.5	79.8	7963	90.7
1977	2822.9	385	81.3	79.5	81.3	79.5	83.7	80.6	7637	87.2
1978	2658.5	385	78.2	79.3	78.2	79.3	78.8	80.3	7388	84.3
1979	2442.2	385	72.4	78.3	72.4	78.3	72.4	79.2	6888	78.6
1980	2842.9	385	84.1	79.0	84.1	79.0	84.1	79.8	7690	87.5
1981	3019.9	385	90.0	80.3	90.0	80.3	89.6	80.9	8278	94.5
1982	2797.5	385	83.9	80.6	83.9	80.6	82.9	81.1	8278	94.5
1983	2950.3	385	89.2	81.4	89.2	81.4	87.5	81.7	8216	93.8
1984	2974.1	385	87.9	82.0	87.9	82.0	87.9	82.2	7982	90.9
1985	3097.9	385	91.3	82.7	91.3	82.7	91.9	83.0	8250	94.2
1986	2792.2	385	82.6	82.7	82.6	82.7	82.8	83.0	7688	87.8
1987	3262.7	417	91.7	83.3	91.7	83.3	89.3	83.4	8252	94.2
1988	2529.4	385	80.0	83.1	80.0	83.1	74.8	82.9	7152	81.4
1989	2710.3	385	90.2	83.5	90.2	83.5	80.4	82.7	8357	95.4
1990	2244.7	385	70.5	82.8	69.6	82.8	66.6	81.8	6622	75.6
1991	1827.6	385	58.2	81.5	58.0	81.5	54.2	80.4	5540	63.2
1992	2853.4	385	87.3	81.8	82.4	81.5	84.4	80.6	8163	92.9
1993	2613.7	385	79.7	81.7	76.6	81.3	77.5	80.4	7204	82.2
1994	1954.3	385	66.9	81.0	56.6	80.1	57.9	79.4	6033	68.9
1995	2120.0	385	65.5	80.4	62.2	79.4	62.9	78.7	5818	66.4
1996	3080.3	385	93.8	80.9	90.4	79.8	91.1	79.2	8362	95.2
1997	2235.5	385	70.3	80.5	67.0	79.3	66.3	78.7	6690	76.4
1998	2714.9	385	83.2	80.6	80.2	79.3	80.5	78.7	7366	84.1
1999	1791.5	385	54.9	79.6	53.2	78.4	53.1	77.8	4927	56.2
2000	2474.3	385	74.6	79.5	73.1	78.2	73.2	77.6	6784	77.2
2001	2656.0	385	80.7	79.5	79.2	78.2	78.8	77.7	7173	81.9
2002	2184.8	385	65.4	79.0	64.2	77.8	64.8	77.2	5857	66.9
2003	2583.1	385	78.8	79.0	76.8	77.7	76.6	77.2	6950	79.3
2004	2714.0	385	83.7	79.2	80.8	77.8	80.3	77.3	7685	87.5
2005	2433.4	385	75.3	79.1	73.1	77.7	72.2	77.2	7228	82.5
2006	2575.1	385	81.3	79.1	76.5	77.6	76.4	77.1	7636	87.2
2007	2290.3	385	69.1	78.8	67.9	77.4	67.9	76.9	6488	74.1
2008	2876.3	385	84.0	79.0	83.4	77.5	85.1	77.1	7464	85.0
2009	2931.8	385	86.3	79.2	85.2	77.7	86.9	77.4	7580	86.5
2010	2928.7	385	87.5	79.4	85.8	77.9	86.8	77.6	7727	88.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		233			68	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	800			1074		
D. Inspection, maintenance or repair without refuelling				116		
E. Testing of plant systems or components				15		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				71		
J. Grid limitation, failure or grid unavailability						6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	17	
L. Human factor related					0	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					11	
Subtotal	800	233	0	1278	97	6
Total		1033			1381	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1973 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems	93	
15. Reactor Cooling Systems		1
16. Steam generation systems	140	31
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		10
Total	233	66

RU-20 NOVOVORONEZH-5

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5585.3 GW(e).h
 Energy Availability Factor: 67.0%
 Load Factor: 67.1%
 Operating Factor: 73.1%
 Energy Unavailability Factor: 33.0%
 Total Off-line Time: 2356 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	711.3	647.3	714.1	688.7	676.6	627.7	673.7	563.9	281.9	0.0	0.0	0.0	5585.3
EAF (%)	99.4	100.0	100.0	100.0	95.8	92.0	95.5	80.6	42.8	0.0	0.0	0.0	67.0
UCF (%)	99.4	100.0	100.0	100.0	96.4	93.9	98.5	97.8	45.3	0.0	0.0	0.0	69.1
LF (%)	100.6	101.4	101.2	100.7	95.7	91.8	95.3	79.8	41.2	0.0	0.0	0.0	67.1
OF (%)	100.0	100.0	100.0	100.0	100.0	96.5	100.0	100.0	83.1	0.0	0.0	0.0	73.1
EUF (%)	0.6	0.0	0.0	0.0	4.2	8.0	4.5	19.4	57.2	100.0	100.0	100.0	33.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.9	100.0	100.0	100.0	26.6
UCLF (%)	0.6	0.0	0.0	0.0	3.6	6.1	1.5	2.3	37.8	0.0	0.0	0.0	4.3
XUF (%)	0.0	0.0	0.0	0.0	0.6	2.0	3.0	17.1	2.5	0.0	0.0	0.0	2.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - APRIL. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 20045 MWH. THE UNIT WAS IN THE OVERHAUL OUTAGE FROM 10.09.25 TO 10.12.31. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 03 Jan 1974 Lifetime Generation: 152107.0 GW(e).h
 Date of First Criticality: 30/04/1980 Cumulative Energy Availability Factor: 63.5%
 Date of Grid Connection: 31/05/1980 Cumulative Load Factor: 63.3%
 Date of Commercial Operation: 20/02/1981 Cumulative Unit Capability Factor: 64.5%
 Cumulative Energy Unavailability Factor: 36.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	4254.5	950	56.4	56.4	56.4	56.4	55.9	55.9	6213	77.5
1982	5042.8	950	60.9	58.7	60.9	58.7	60.6	58.3	6631	75.7
1983	6607.5	950	79.5	65.9	79.5	65.9	79.4	65.6	7716	88.1
1984	6979.6	950	83.4	70.4	83.4	70.4	83.6	70.2	7742	88.1
1985	6894.3	950	83.1	73.0	83.1	73.0	82.8	72.8	7979	91.1
1986	5523.8	950	66.0	71.8	65.9	71.8	66.4	71.7	6806	77.7
1987	7052.7	1000	81.8	73.3	81.8	73.3	80.5	73.0	7399	84.5
1988	3017.8	950	36.5	68.7	36.5	68.7	36.2	68.4	3439	39.2
1989	3308.9	950	40.9	65.6	40.9	65.6	39.8	65.2	3778	43.1
1990	3913.3	950	47.7	63.8	47.6	63.8	47.0	63.4	4715	53.8
1991	5878.2	950	71.5	64.5	71.5	64.5	70.6	64.0	6996	79.9
1992	3752.8	950	45.9	62.9	45.7	62.9	45.0	62.4	5244	59.7
1993	5935.4	950	73.8	63.8	72.6	63.6	71.3	63.1	7448	85.0
1994	2281.9	950	33.2	61.6	28.9	61.2	27.4	60.6	4288	48.9
1995	4753.7	950	63.9	61.7	57.5	60.9	57.1	60.3	6670	76.1
1996	3861.8	950	46.7	60.8	46.7	60.0	46.3	59.5	4759	54.2
1997	5949.3	950	71.7	61.4	71.4	60.7	71.5	60.2	6854	78.2
1998	3771.8	950	45.5	60.5	44.9	59.8	45.3	59.3	4457	50.9
1999	4845.4	950	61.2	60.6	58.7	59.8	58.2	59.3	6062	69.2
2000	5278.6	950	65.6	60.8	63.5	59.9	63.3	59.5	6479	73.8
2001	5984.6	950	73.2	61.4	72.3	60.5	71.9	60.1	7508	85.7
2002	6762.2	950	83.1	62.4	80.7	61.4	81.3	61.0	7430	84.8
2003	6951.2	950	84.5	63.4	83.1	62.4	83.5	62.0	7507	85.7
2004	3610.6	950	43.6	62.5	43.1	61.6	43.3	61.2	4032	45.9
2005	2544.3	950	31.4	61.3	30.6	60.3	30.6	60.0	2861	32.7
2006	7264.4	950	87.8	62.3	86.7	61.4	87.3	61.1	7762	88.6
2007	6556.3	950	79.8	63.0	78.5	62.0	78.8	61.7	7140	81.5
2008	7285.2	950	87.0	63.8	86.9	62.9	87.3	62.6	7718	87.9
2009	6518.1	950	77.9	64.3	77.6	63.4	78.3	63.2	6865	78.4
2010	5585.3	950	69.1	64.5	67.0	63.5	67.1	63.3	6404	73.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					784	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	2329			1219		
D. Inspection, maintenance or repair without refuelling				515		
L. Human factor related		25				
Subtotal	2329	25	0	1734	785	0
Total	2354			2519		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		321
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		7
14. Safety Systems		2
15. Reactor Cooling Systems		54
16. Steam generation systems		268
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System		18
35. All other I&C Systems		3
41. Main Generator Systems		66
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems		8
Total	0	779

RU-59 ROSTOV-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7398.5 GW(e).h
Energy Availability Factor: 88.6%
Load Factor: 88.9%
Operating Factor: 89.4%
Energy Unavailability Factor: 11.4%
Total Off-line Time: 932 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	584.7	665.0	682.5	33.9	601.7	715.1	716.9	535.1	622.8	732.1	741.4	767.2	7398.5
EAF (%)	79.7	100.0	98.6	6.2	83.4	99.9	99.2	99.2	100.0	96.4	100.0	100.0	88.6
UCF (%)	79.7	100.0	100.0	6.8	83.4	100.0	100.0	100.0	100.0	96.4	100.0	100.0	88.9
LF (%)	82.7	104.2	96.7	5.0	85.1	104.5	101.4	75.7	91.1	103.4	108.4	108.5	88.9
OF (%)	80.2	100.0	100.0	7.1	84.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.4
EUUF (%)	20.3	0.0	1.4	93.8	16.6	0.1	0.8	0.8	0.0	3.6	0.0	0.0	11.4
PUF (%)	0.0	0.0	0.0	93.2	16.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
UCLF (%)	20.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	0.0	2.0
XUF (%)	0.0	0.0	1.4	0.7	0.0	0.1	0.8	0.8	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MARCH, MAY - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 340534 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.04.03 TO 10.05.05. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 09 Jan 1981
Date of First Criticality: 23/02/2001
Date of Grid Connection: 30/03/2001
Date of Commercial Operation: 25/12/2001

Lifetime Generation: 70390.0 GW(e).h
Cumulative Energy Availability Factor: 86.2%
Cumulative Load Factor: 88.6%
Cumulative Unit Capability Factor: 86.7%
Cumulative Energy Unavailability Factor: 13.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2001			Data not provided							
2002	7176.2	950	85.5	85.5	84.1	84.1	86.2	86.2	7543	86.1
2003	6973.9	950	82.6	84.0	81.3	82.7	83.8	85.0	7154	81.7
2004	7439.3	950	88.0	85.3	87.8	84.4	89.1	86.4	7766	88.4
2005	7232.9	950	86.9	85.7	85.9	84.8	86.9	86.5	7628	87.1
2006	7216.4	950	84.2	85.4	83.8	84.6	86.7	86.6	7386	84.3
2007	7309.4	950	85.5	85.4	85.3	84.7	87.8	86.8	7536	86.0
2008	7745.7	950	88.6	85.9	88.5	85.2	92.8	87.6	7799	88.8
2009	7927.0	950	90.3	86.4	90.3	85.9	95.3	88.6	7916	90.4
2010	7398.5	950	88.9	86.7	88.6	86.2	88.9	88.6	7828	89.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2002 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		147			83	
C. Inspection, maintenance or repair combined with refuelling	785			948		
L. Human factor related					1	
Subtotal	785	147	0	948	84	0
Total		932			1032	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2002 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		8
16. Steam generation systems	147	
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		2
33. Circulating Water System		4
41. Main Generator Systems		61
42. Electrical Power Supply Systems		3
Total	147	81

RU-62 ROSTOV-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")
Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 692.2 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 97.9%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h												692.2	692.2
EAF (%)												100.0	100.0
UCF (%)												100.0	100.0
LF (%)												97.9	97.9
OF (%)												100.0	100.0
EUUF (%)												0.0	0.0
PUF (%)												0.0	0.0
UCLF (%)												0.0	0.0
XUF (%)												0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 1292 MWH. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 05 Jan 1983
Date of First Criticality: 22/01/2010
Date of Grid Connection: 18/03/2010
Date of Commercial Operation: 12 Oct 2010

Lifetime Generation: 4303.8 GW(e).h
Cumulative Energy Availability Factor: 100.0%
Cumulative Load Factor: 97.9%
Cumulative Unit Capability Factor: 100.0%
Cumulative Energy Unavailability Factor: 0.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2010	692.2	950	100.0	100.0	100.0	100.0	97.9	97.9	744	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2010 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External

The reactor has not yet completed a full year of commercial operation.

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2010 to 2010 Average Hours Lost Per Year

The reactor has not yet completed a full year of commercial operation.

RU-23 SMOLENSK-1

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
 Net Reference Unit Power (RUP) at the beginning of 2010: 925.0 MW(e)
 Design Net Capacity: 925.0 MW(e)
 Design Discharge Burnup: 22200 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4896.3 GW(e).h
 Energy Availability Factor: 61.1%
 Load Factor: 60.4%
 Operating Factor: 61.9%
 Energy Unavailability Factor: 38.9%
 Total Off-line Time: 3336 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	712.5	642.1	664.4	675.7	609.5	657.2	657.8	277.0	0.0	0.0	0.0	0.0	4896.3
EAF (%)	100.0	100.0	100.0	100.0	99.8	98.4	95.7	41.6	0.0	0.0	0.0	0.0	61.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	99.9	100.0	43.5	0.0	0.0	0.0	0.0	61.8
LF (%)	103.5	103.3	96.7	101.5	88.6	98.7	95.6	40.3	0.0	0.0	0.0	0.0	60.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	45.3	0.0	0.0	0.0	0.0	61.9
EUAF (%)	0.0	0.0	0.0	0.0	0.2	1.6	4.3	58.4	100.0	100.0	100.0	100.0	38.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.5	100.0	100.0	100.0	100.0	38.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.2	1.5	4.2	1.9	0.0	0.0	0.0	0.0	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MAY, AUGUST - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 58263 MWH. THE UNIT WAS IN THE INTERMEDIATE MAINTENANCE OUTAGE FROM 10.08.15 TO 10.12.31. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 10 Jan 1975
 Date of First Criticality: 09 Oct 1982
 Date of Grid Connection: 12 Sep 1982
 Date of Commercial Operation: 30/09/1983
 Lifetime Generation: 160890.0 GW(e).h
 Cumulative Energy Availability Factor: 71.9%
 Cumulative Load Factor: 71.5%
 Cumulative Unit Capability Factor: 74.2%
 Cumulative Energy Unavailability Factor: 28.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2275.4	925	99.7	99.7	99.7	99.7	84.0	84.0	2547	87.0
1984	6921.4	925	84.2	88.1	84.2	88.1	85.2	84.9	7830	89.1
1985	5850.2	925	74.9	82.4	72.4	81.4	72.2	79.5	6806	77.7
1986	3039.8	925	37.8	69.1	37.8	68.3	37.5	66.9	3472	39.6
1987	7445.8	1000	86.7	73.4	86.7	72.8	85.0	71.3	7620	87.0
1988	6695.6	925	81.9	75.0	81.9	74.5	82.4	73.4	7288	83.0
1989	6506.5	925	79.7	75.7	79.3	75.3	80.3	74.4	7177	81.9
1990	6227.8	925	76.6	75.8	76.1	75.4	76.9	74.8	6851	78.2
1991	6693.9	925	81.3	76.5	81.3	76.1	82.6	75.7	7252	82.8
1992	6849.4	925	83.7	77.2	83.7	76.9	84.3	76.6	7563	86.1
1993	6290.6	925	78.4	77.3	78.0	77.0	77.6	76.7	6993	79.8
1994	4217.8	925	71.0	76.8	57.8	75.3	52.1	74.6	6286	71.8
1995	5002.5	925	77.3	76.8	63.0	74.3	61.7	73.5	6390	72.9
1996	5666.4	925	71.7	76.5	71.6	74.1	69.7	73.2	6604	75.2
1997	4674.5	925	59.1	75.3	57.8	73.0	57.7	72.2	5366	61.3
1998	3554.1	925	58.8	74.2	45.0	71.2	43.9	70.3	5411	61.8
1999	6478.9	925	83.5	74.8	80.1	71.7	80.0	70.9	7417	84.7
2000	5228.5	925	64.4	74.2	63.8	71.3	64.3	70.5	5738	65.3
2001	5165.1	925	67.4	73.8	63.2	70.8	63.7	70.2	5940	67.8
2002	6866.7	925	85.1	74.4	83.7	71.5	84.7	70.9	7587	86.6
2003	6711.8	925	84.4	74.9	82.9	72.0	82.8	71.5	7533	86.0
2004	2337.1	925	29.1	72.7	28.5	70.0	28.8	69.5	2592	29.5
2005	7354.1	925	94.7	73.7	90.6	70.9	90.7	70.4	8414	96.0
2006	5417.1	925	67.1	73.4	67.1	70.8	66.9	70.3	6021	68.7
2007	6569.7	925	80.8	73.7	80.3	71.2	81.1	70.7	7138	81.5
2008	7794.9	925	95.2	74.6	94.9	72.1	95.9	71.7	8430	96.0
2009	6122.3	925	77.6	74.7	77.3	72.3	75.6	71.9	6974	79.6
2010	4896.3	925	61.8	74.2	61.1	71.9	60.4	71.5	5424	61.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					96	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	3335			956		
D. Inspection, maintenance or repair without refuelling				392		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				378		16
J. Grid limitation, failure or grid unavailability						6
Subtotal	3335	0	0	1726	96	22
Total		3335			1844	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		15
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems		11
14. Safety Systems		8
15. Reactor Cooling Systems		27
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		2
32. Feedwater and Main Steam System		10
42. Electrical Power Supply Systems		2
Total	0	90

RU-24 SMOLENSK-2

Operator: REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")

Contractor: ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")

1. Station Details

Type: LWGR
 Net Reference Unit Power (RUP) at the beginning of 2010: 925.0 MW(e)
 Design Net Capacity: 925.0 MW(e)
 Design Discharge Burnup: 22200 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6651.2 GW(e).h
 Energy Availability Factor: 82.0%
 Load Factor: 82.1%
 Operating Factor: 87.1%
 Energy Unavailability Factor: 18.0%
 Total Off-line Time: 1134 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	667.4	642.6	671.6	681.4	465.8	0.0	219.9	572.4	671.6	698.7	661.1	698.8	6651.2
EAF (%)	96.9	100.0	100.0	100.0	73.1	0.0	34.1	83.5	99.9	100.0	97.8	100.0	82.0
UCF (%)	96.9	100.0	100.0	100.0	73.1	0.0	34.9	85.9	99.9	100.0	97.8	100.0	82.3
LF (%)	97.0	103.4	97.7	102.3	67.7	0.0	32.0	83.2	100.8	101.4	99.3	101.5	82.1
OF (%)	100.0	100.0	100.0	100.0	74.3	0.0	70.0	100.0	100.0	100.0	100.0	100.0	87.1
EUf (%)	3.1	0.0	0.0	0.0	26.9	100.0	65.9	16.5	0.1	0.0	2.2	0.0	18.0
PUF (%)	0.0	0.0	0.0	0.0	26.9	100.0	65.1	14.0	0.0	0.0	0.0	0.0	17.2
UCLF (%)	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	2.2	0.0	0.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.4	0.0	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - MAY, SEPTEMBER - DECEMBER. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 78697 MWH. THE UNIT WAS IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.05.24 TO 10.07.10. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 06 Jan 1976 Lifetime Generation: 154189.0 GW(e).h
 Date of First Criticality: 04 Sep 1985 Cumulative Energy Availability Factor: 74.4%
 Date of Grid Connection: 31/05/1985 Cumulative Load Factor: 74.3%
 Date of Commercial Operation: 07 Feb 1985 Cumulative Unit Capability Factor: 76.9%
 Cumulative Energy Unavailability Factor: 25.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	3308.1	925	90.6	90.6	81.3	81.3	81.0	81.0	4059	91.9
1986	6667.3	925	82.6	85.3	82.6	82.2	82.3	81.8	7442	85.0
1987	6364.9	1000	74.5	80.8	74.5	79.0	72.7	78.0	6707	76.6
1988	6757.2	925	83.6	81.5	83.5	80.2	83.2	79.4	7594	86.5
1989	6627.3	925	81.9	81.6	81.5	80.5	81.8	80.0	7336	83.7
1990	6710.6	925	83.0	81.9	82.5	80.9	82.8	80.5	7453	85.1
1991	5796.7	925	71.4	80.3	71.4	79.4	71.5	79.1	6495	74.1
1992	6731.6	925	83.9	80.7	82.6	79.8	82.9	79.6	7472	85.1
1993	6634.1	925	84.9	81.2	82.7	80.2	81.9	79.9	7492	85.5
1994	5259.8	925	80.2	81.1	66.6	78.8	64.9	78.3	7044	80.4
1995	5337.4	925	80.3	81.1	66.8	77.6	65.9	77.1	6738	76.9
1996	6127.7	925	79.1	80.9	77.8	77.6	75.4	77.0	7010	79.8
1997	4991.0	925	61.7	79.4	61.6	76.4	61.6	75.8	5642	64.4
1998	5297.0	925	73.9	79.0	65.6	75.6	65.4	75.0	6576	75.1
1999	5362.5	925	69.1	78.3	66.0	74.9	66.2	74.4	6090	69.5
2000	6566.1	925	80.5	78.4	80.1	75.3	80.8	74.8	7108	80.9
2001	6457.6	925	81.0	78.6	79.0	75.5	79.7	75.1	7537	86.0
2002	3431.1	925	43.6	76.6	41.7	73.6	42.3	73.2	3890	44.4
2003	6438.6	925	81.4	76.9	79.1	73.9	79.5	73.6	7734	88.3
2004	7480.1	925	93.7	77.7	90.9	74.7	92.1	74.5	8312	94.6
2005	3053.4	925	41.7	76.0	37.7	72.9	37.7	72.7	3734	42.6
2006	7623.9	925	93.1	76.8	93.1	73.9	94.1	73.7	8306	94.8
2007	4096.4	925	50.8	75.6	49.7	72.8	50.6	72.7	4878	55.7
2008	6718.8	925	83.7	76.0	83.2	73.2	82.7	73.1	7823	89.1
2009	7668.4	925	94.1	76.7	93.8	74.1	94.6	74.0	8279	94.5
2010	6651.2	925	82.3	76.9	82.0	74.4	82.1	74.3	7626	87.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					59	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	1134			792		
D. Inspection, maintenance or repair without refuelling				370		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				185		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				339		13
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	
Subtotal	1134	0	0	1686	64	15
Total		1134			1765	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		10
15. Reactor Cooling Systems		19
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		4
42. Electrical Power Supply Systems		13
Total	0	53

RU-67 SMOLENSK-3**Operator:** REA (JOINT STOCK COMPANY "CONCERN ROSENERGOATOM")**Contractor:** ROSATOM (STATE ATOMIC ENERGY CORPORATION "ROSATOM")**1. Station Details**

Type: LWGR
Net Reference Unit Power (RUP) at the beginning of 2010: 925.0 MW(e)
Design Net Capacity: 925.0 MW(e)
Design Discharge Burnup: 22200 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7738.8 GW(e).h
Energy Availability Factor: 93.5%
Load Factor: 95.5%
Operating Factor: 94.0%
Energy Unavailability Factor: 6.5%
Total Off-line Time: 527 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	664.9	658.8	411.9	436.2	691.9	679.9	682.0	677.1	683.6	721.5	704.6	726.5	7738.8
EAF (%)	100.0	99.8	61.9	64.1	100.0	100.0	99.3	98.8	100.0	99.5	99.7	99.7	93.5
UCF (%)	100.0	99.8	61.9	64.1	100.0	100.0	100.0	100.0	100.0	99.5	99.7	99.7	93.7
LF (%)	96.6	106.0	59.9	65.5	100.5	102.1	99.1	98.4	102.6	104.7	105.8	105.6	95.5
OF (%)	100.0	100.0	62.0	66.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.0
EUUF (%)	0.0	0.2	38.1	35.9	0.0	0.0	0.7	1.2	0.0	0.5	0.3	0.3	6.5
PUF (%)	0.0	0.0	38.1	32.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9
UCLF (%)	0.0	0.2	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.3	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.2	0.0	0.0	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE RUSSIAN NPPS ARE OPERATING IN THE BASELOAD MODE AGREED WITH THE FEDERAL TARIFFS SERVICE. UNIT OPERATION AT POWER LEVEL ABOVE INSTALLED CAPACITY TOOK PLACE IN JANUARY - AUGUST. ADDITIONAL ELECTRICITY GENERATION AMOUNTED TO 140926 MWH. THE UNIT WAS IN THE ROUTINE MAINTENANCE OUTAGE FROM 10.03.20 TO 10.04.10. RADIONUCLIDES CONTENT IN THE MONITORED ENVIRONMENTAL OBJECTS IN THE PLANT VICINITY WAS ON THE LEVEL OF AVERAGE BACKGROUND VALUES TYPICAL FOR THE EUROPEAN PART OF THE RUSSIAN FEDERATION.

5. Historical Summary

Date of Construction Start: 05 Jan 1984 **Lifetime Generation:** 132481.0 GW(e).h
Date of First Criticality: 29/12/1989 **Cumulative Energy Availability Factor:** 78.8%
Date of Grid Connection: 17/01/1990 **Cumulative Load Factor:** 79.0%
Date of Commercial Operation: 10 Dec 1990 **Cumulative Unit Capability Factor:** 81.2%
Cumulative Energy Unavailability Factor: 21.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	2066.9	925	99.1	99.1	99.1	99.1	101.2	101.2	2208	100.0
1991	6561.7	925	80.9	84.5	80.9	84.5	81.0	85.0	7338	83.8
1992	6866.6	925	83.9	84.3	83.9	84.3	84.5	84.8	7515	85.6
1993	6596.0	925	82.6	83.8	81.4	83.4	81.4	83.8	7419	84.7
1994	5513.7	925	82.3	83.4	72.5	80.8	68.0	80.1	6701	76.5
1995	5091.0	925	78.2	82.4	63.2	77.5	62.8	76.8	5844	66.7
1996	6496.6	925	82.2	82.4	80.8	78.0	80.0	77.3	7268	82.7
1997	5559.3	925	69.3	80.6	69.3	76.8	68.6	76.1	6469	73.8
1998	4575.9	925	68.9	79.2	57.5	74.5	56.5	73.7	6162	70.3
1999	6411.0	925	79.3	79.2	78.2	74.9	79.1	74.3	7063	80.6
2000	6970.5	925	84.7	79.7	84.6	75.8	85.8	75.4	7542	85.9
2001	6951.7	925	87.3	80.4	85.4	76.7	85.8	76.3	7823	89.3
2002	7204.9	925	88.7	81.1	87.7	77.6	88.9	77.4	7831	89.4
2003	7038.2	925	87.1	81.5	86.3	78.2	86.9	78.1	7697	87.9
2004	7085.7	925	87.9	82.0	86.9	78.8	87.2	78.7	7765	88.4
2005	7303.7	925	93.1	82.7	90.4	79.6	90.1	79.5	8192	93.5
2006	4943.0	925	60.7	81.3	60.7	78.4	61.0	78.3	5631	64.3
2007	7566.3	925	93.2	82.0	92.5	79.2	93.4	79.2	8247	94.1
2008	5093.4	925	61.3	80.9	61.2	78.3	62.7	78.3	5396	61.4
2009	6083.0	925	74.3	80.5	74.3	78.0	75.1	78.1	6706	76.6
2010	7738.8	925	93.7	81.2	93.5	78.8	95.5	79.0	8233	94.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		24			57	
C. Inspection, maintenance or repair combined with refuelling	527			653		
D. Inspection, maintenance or repair without refuelling				376		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				256		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				149		76
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					25	
Subtotal	527	24	0	1434	82	76
Total		551			1592	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems	24	
21. Fuel Handling and Storage Facilities		17
31. Turbine and auxiliaries		2
35. All other I&C Systems		5
41. Main Generator Systems		2
42. Electrical Power Supply Systems		8
99. No System Code		6
Total	24	53

SK-13 BOHUNICE-3

Operator: SE,plc (Slovenské elektrárne, a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 442.0 MW(e)
 Design Net Capacity: 420.0 MW(e)
 Design Discharge Burnup: 46000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3385.9 GW(e).h
 Energy Availability Factor: 84.8%
 Load Factor: 86.0%
 Operating Factor: 93.5%
 Energy Unavailability Factor: 15.2%
 Total Off-line Time: 566 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	317.6	291.9	323.0	314.0	325.5	311.2	309.6	210.0	41.1	345.5	332.4	264.3	3385.9
EAF (%)	93.1	95.0	95.7	96.7	97.2	97.7	93.8	63.4	12.0	98.2	97.6	75.9	84.8
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	97.4	66.0	12.0	99.7	100.0	79.4	88.0
LF (%)	96.6	98.3	98.4	98.7	99.0	97.8	94.1	63.9	12.9	98.3	97.8	75.3	86.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	98.1	100.0	23.3	100.0	100.0	100.0	93.5
EUF (%)	6.9	5.0	4.3	3.3	2.8	2.3	6.2	36.6	88.0	1.8	2.4	24.1	15.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.8	88.0	0.3	0.0	20.6	11.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.1	0.0	0.0	0.0	0.0	0.2
XUF (%)	6.9	5.0	4.3	3.3	2.8	2.3	3.6	2.6	0.0	1.5	2.4	3.5	3.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

I.-VI.2010 OPERATION AT FULL POWER IN BASE LOAD MODE WITHOUT ANY PEL, UEL. STEAM EXTRACTION FOR DISTRICT HEATING EXCHANGER. VII.-IX.2010 AUTOMATIC SCRAM (AO-1), TG31 TRIP (UEL), POWER (FUEL) COAST DOWN, PLANNED TG31 SHUTDOWN FOR RECONSTRUCTION AND POWER UPRATE, ANNUAL MAINTENANCE AND REFUELLING. X.-XII.2010 SCHEDULED MEASURING AND TESTING, TG31 PLANNED SHUTDOWN DUE TO GENERATOR WATER COOLING CIRCUIT REPAIR.

5. Historical Summary

Date of Construction Start: 12 Jan 1976
 Date of First Criticality: 08 Jul 1984
 Date of Grid Connection: 20/08/1984
 Date of Commercial Operation: 14/02/1985

Lifetime Generation: 72796.0 GW(e).h
 Cumulative Energy Availability Factor: 78.3%
 Cumulative Load Factor: 76.6%
 Cumulative Unit Capability Factor: 81.5%
 Cumulative Energy Unavailability Factor: 21.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	2435.0	408	76.8	76.8	76.8	76.8	74.5	74.5	6322	78.9
1986	2674.1	408	75.4	76.1	75.4	76.1	74.8	74.6	7089	80.9
1987	1997.4	408	55.5	69.0	53.7	68.4	55.9	68.2	5181	59.1
1988	2866.9	408	80.2	71.9	79.9	71.3	80.0	71.2	7329	83.4
1989	2992.3	408	85.0	74.6	84.1	73.9	83.7	73.8	7633	87.1
1990	2829.1	408	80.5	75.6	79.2	74.8	79.2	74.7	7376	84.2
1991	2585.6	408	74.2	75.4	71.9	74.4	72.3	74.3	6717	76.7
1992	3140.7	408	83.9	76.4	82.8	75.5	87.6	76.0	7528	85.7
1993	2973.1	408	86.5	77.6	83.2	76.3	83.2	76.8	7721	88.1
1994	2806.8	405	84.0	78.2	79.1	76.6	79.1	77.1	7423	84.7
1995	2536.7	408	78.1	78.2	70.1	76.0	71.0	76.5	6440	73.5
1996	3045.9	436	85.6	78.9	82.5	76.6	79.5	76.8	7504	85.4
1997	3096.4	440	87.7	79.6	84.0	77.2	80.3	77.1	7711	88.0
1998	2804.6	408	85.3	80.0	81.8	77.5	78.5	77.2	7571	86.4
1999	2468.5	408	76.5	79.8	69.7	77.0	69.1	76.6	6620	75.6
2000	2806.7	408	87.9	80.3	79.8	77.2	78.3	76.7	7776	88.5
2001	2687.0	408	86.6	80.7	76.5	77.1	75.2	76.6	7680	87.7
2002	2690.7	408	87.4	81.0	83.9	77.5	75.3	76.6	7711	88.0
2003	2485.0	408	78.3	80.9	75.5	77.4	69.5	76.2	6908	78.9
2004	2564.5	408	82.0	80.9	79.0	77.5	71.6	76.0	7228	82.3
2005	2587.7	408	79.4	80.9	76.7	77.5	72.4	75.8	7034	80.3
2006	2582.6	408	80.7	80.9	78.4	77.5	72.3	75.6	7106	81.1
2007	2432.6	408	73.8	80.6	71.6	77.2	68.1	75.3	6687	76.3
2008	3038.4	429	86.7	80.8	85.8	77.6	83.7	75.7	7680	87.4
2009	3309.7	442	89.3	81.2	87.2	78.0	87.4	76.2	8176	93.3
2010	3385.9	472	88.0	81.5	84.8	78.3	86.0	76.6	8194	93.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		14			76	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	552			1238		
D. Inspection, maintenance or repair without refuelling				126		
J. Grid limitation, failure or grid unavailability						7
Subtotal	552	14	0	1364	76	7
Total		566			1447	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		5
14. Safety Systems		1
15. Reactor Cooling Systems		14
16. Steam generation systems		32
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		9
33. Circulating Water System		1
41. Main Generator Systems		0
42. Electrical Power Supply Systems	14	6
Total	14	71

SK-14 BOHUNICE-4

Operator: SE,plc (Slovenské elektrárne, a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 448.0 MW(e)
 Design Net Capacity: 408.0 MW(e)
 Design Discharge Burnup: 46000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3513.1 GW(e).h
 Energy Availability Factor: 87.7%
 Load Factor: 87.6%
 Operating Factor: 93.8%
 Energy Unavailability Factor: 12.3%
 Total Off-line Time: 546 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	328.5	295.8	328.0	317.9	324.5	236.6	41.1	319.7	326.6	335.1	322.3	337.1	3513.1
EAF (%)	96.7	96.5	97.2	97.6	96.4	73.7	13.2	91.8	98.1	97.1	97.6	96.1	87.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	76.7	13.5	93.5	100.0	99.5	100.0	100.0	90.3
LF (%)	98.5	98.2	98.5	98.5	97.4	73.4	12.3	91.0	96.1	95.3	94.8	96.0	87.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	26.6	100.0	100.0	100.0	100.0	100.0	93.8
EUUF (%)	3.3	3.5	2.8	2.4	3.6	26.3	86.8	8.2	1.9	2.9	2.4	3.9	12.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	23.3	86.5	6.4	0.0	0.0	0.0	0.0	9.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
XUF (%)	3.3	3.5	2.8	2.4	3.6	3.0	0.4	1.8	1.9	2.4	2.4	3.9	2.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OPERATION AT FULL POWER IN BASE MODE. VI-VII.2010 TG42 EXTENDED SHUTDOWN FOR RECONSTRUCTION, ANNUAL MAINTENANCE AND REFUELLING. REACTOR THERMAL POWER INCREASING AND TG42 POWER UPGRADE. MODIFICATION OF GENERATOR AND GENERATOR POWER OUTLET, UNIT TRANSFORMER, INSTALATION OF TG42 DIGITAL CONTROL SYSTEM. X-XII.2010 FREQUENCY CONTROL AND LOAD FOLLOWING.

5. Historical Summary

Date of Construction Start: 12 Jan 1976 Lifetime Generation: 71560.1 GW(e).h
 Date of First Criticality: 08 Feb 1985 Cumulative Energy Availability Factor: 79.8%
 Date of Grid Connection: 08 Sep 1985 Cumulative Load Factor: 77.9%
 Date of Commercial Operation: 18/12/1985 Cumulative Unit Capability Factor: 82.9%
 Cumulative Energy Unavailability Factor: 20.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	298.1	408	100.0	100.0	100.0	100.0	98.2	98.2	744	100.0
1986	2887.9	408	81.0	82.5	81.0	82.5	80.8	82.2	7294	83.3
1987	3084.7	408	86.6	84.5	86.1	84.2	86.3	84.2	7783	88.8
1988	2786.5	408	78.0	82.4	77.8	82.1	77.7	82.1	7248	82.5
1989	2827.7	408	80.0	81.8	79.2	81.4	79.1	81.3	7548	86.2
1990	2873.8	408	82.0	81.8	80.7	81.3	80.4	81.2	7427	84.8
1991	2850.5	408	82.9	82.0	80.4	81.1	79.8	80.9	7438	84.9
1992	2711.9	408	73.3	80.8	70.4	79.6	75.7	80.2	6714	76.4
1993	2847.6	408	82.6	81.0	79.7	79.6	79.7	80.1	7341	83.8
1994	2791.4	405	83.9	81.3	78.7	79.5	78.7	80.0	7389	84.3
1995	2823.7	408	88.5	82.0	79.3	79.5	79.0	79.9	7211	82.3
1996	2834.9	436	79.2	81.8	76.1	79.2	74.0	79.3	6953	79.2
1997	2953.5	440	84.7	82.0	80.2	79.3	76.6	79.1	7469	85.3
1998	2822.4	408	85.7	82.3	82.4	79.5	79.0	79.1	7525	85.9
1999	2656.5	408	81.7	82.2	75.1	79.2	74.3	78.7	7283	83.1
2000	2431.9	408	76.3	81.9	68.9	78.5	67.9	78.0	6791	77.3
2001	2793.3	408	86.7	82.2	79.2	78.6	78.2	78.0	7721	88.1
2002	2823.2	408	87.9	82.5	85.0	78.9	79.0	78.1	7742	88.4
2003	2814.9	408	87.8	82.8	84.4	79.2	78.8	78.1	7737	88.3
2004	2390.9	408	77.0	82.5	74.4	79.0	66.7	77.5	6786	77.3
2005	2841.0	408	87.3	82.7	84.3	79.2	79.5	77.6	7671	87.6
2006	2489.3	408	79.3	82.5	77.0	79.1	69.6	77.2	7035	80.3
2007	2648.5	408	79.9	82.4	78.0	79.1	74.1	77.1	7053	80.5
2008	2739.0	410	79.6	82.3	78.8	79.1	76.3	77.1	7254	82.6
2009	3239.6	448	88.9	82.6	86.9	79.4	87.1	77.5	8118	92.7
2010	3513.1	472	90.3	82.9	87.7	79.8	87.6	77.9	8214	93.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					47	
C. Inspection, maintenance or repair combined with refuelling				1167		
D. Inspection, maintenance or repair without refuelling				56		
E. Testing of plant systems or components				1		
F. Major back-fitting, refurbishment or upgrading activities with refuelling	546					
J. Grid limitation, failure or grid unavailability						0
L. Human factor related					0	
Subtotal	546	0	0	1224	47	0
Total		546			1271	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		6
15. Reactor Cooling Systems		0
16. Steam generation systems		28
17. Safety I&C Systems (excluding reactor I&C)		4
32. Feedwater and Main Steam System		5
33. Circulating Water System		0
35. All other I&C Systems		0
42. Electrical Power Supply Systems		0
XX. Miscellaneous Systems		1
Total	0	44

SK-6 MOCHOVCE-1

Operator: SE,plc (Slovenské elektrárne, a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 436.0 MW(e)
 Design Net Capacity: 387.0 MW(e)
 Design Discharge Burnup: 44000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3446.8 GW(e).h
 Energy Availability Factor: 91.0%
 Load Factor: 90.2%
 Operating Factor: 92.2%
 Energy Unavailability Factor: 9.0%
 Total Off-line Time: 686 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	325.3	291.1	324.4	293.9	75.5	307.6	257.1	310.8	309.9	324.3	305.9	321.1	3446.8
EAF (%)	100.0	99.3	100.0	93.2	25.5	98.6	80.8	98.7	100.0	100.0	98.2	99.5	91.0
UCF (%)	100.0	99.3	100.0	96.5	25.6	99.4	82.2	99.1	100.0	100.0	98.2	99.5	91.5
LF (%)	100.3	99.4	100.1	93.6	23.3	98.0	79.2	95.8	98.7	99.8	97.4	99.0	90.2
OF (%)	100.0	100.0	100.0	96.9	27.0	100.0	83.7	100.0	100.0	100.0	100.0	100.0	92.2
EUf (%)	0.0	0.7	0.0	6.8	74.5	1.4	19.2	1.3	0.0	0.0	1.8	0.5	9.0
PUF (%)	0.0	0.7	0.0	3.5	74.4	0.1	0.5	0.0	0.0	0.0	0.0	0.0	6.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.6	17.4	0.9	0.0	0.0	1.8	0.5	1.8
XUF (%)	0.0	0.0	0.0	3.3	0.0	0.8	1.3	0.4	0.0	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

FIRST UNIT OF MOCHOVCE NPP WAS OPERATED LARGELY AT FULL POWER IN A BASE LOAD MODE. A LOAD-FOLLOWING HAS BEEN REQUIRED BY DISPATCHER FOR A PERIOD. UNIT PROVIDES GRID SUPPORTING SERVICES – PRIMARY, SECONDARY POWER CONTROL FOR GRID ADJUSTMENT AND TERTIARY POWER CONTROL. OVER THE REPORTING PERIOD THERE WERE APPROXIMATELY 6.5 EFPD LOSSES DUE TO FORCED UNPLANNED EVENTS. THERE WERE NO AUTOMATIC REACTOR SCRAMS. ALL PLANNED MAINTENANCE ACTIVITIES DURING THE SHORT GENERAL OVERHAUL WERE ACCOMPLISHED EARLIER AND FIRST TURBOGENERATOR WAS CONNECTED TO THE GRID 0.7 DAY IN ADVANCE. THE MOST IMPORTANT EVENT LOAD SHED LOGIC ACTUATION OCCURRED IN JULY DUE TO FAILURE OF SELF-CONSUMPTION TRANSFORMER 0BBT01. THROUGHOUT THE YEAR THERE WERE NOT ANY DELAYS OF THE PLANNED OUTAGES NEITHER THE LOSSES DUE TO GRID PROBLEMS. OTHER FACTORS AFFECTING ENERGY GENERATION OVER THE REPORTING PERIOD WERE LIMITATIONS DUE TO FUEL MANAGEMENT, COAST-DOWN OPERATION AND ENVIRONMENTAL CONDITIONS (COOLING WATER TEMPERATURE LIMITS).

5. Historical Summary

Date of Construction Start: 13/10/1983 Lifetime Generation: 36077.1 GW(e).h
 Date of First Criticality: 06 Sep 1998 Cumulative Energy Availability Factor: 82.9%
 Date of Grid Connection: 07 Apr 1998 Cumulative Load Factor: 81.3%
 Date of Commercial Operation: 29/10/1998 Cumulative Unit Capability Factor: 85.3%
 Cumulative Energy Unavailability Factor: 17.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1998	784.8	408	97.9	97.9	96.7	96.7	87.1	87.1	2189	99.1
1999	2376.1	404	70.4	76.0	65.8	72.1	67.1	71.2	6397	73.0
2000	2816.9	404	90.0	82.2	79.4	75.3	79.4	74.8	8311	94.6
2001	2423.6	404	75.0	80.0	68.1	73.1	68.5	72.9	6648	75.9
2002	2914.8	405	86.3	81.5	83.3	75.5	82.2	75.1	7628	87.1
2003	2796.6	405	83.0	81.8	82.3	76.8	78.8	75.8	7324	83.6
2004	2996.0	405	88.6	82.8	88.1	78.6	84.2	77.1	7801	88.8
2005	2712.6	405	80.8	82.6	80.3	78.9	76.5	77.0	7128	81.4
2006	3059.7	405	90.7	83.5	90.0	80.2	86.2	78.2	7977	91.1
2007	3142.7	405	90.0	84.2	89.2	81.2	88.6	79.3	7954	90.8
2008	3329.4	436	91.0	84.9	90.6	82.1	89.6	80.3	8064	91.8
2009	3111.6	436	82.4	84.7	82.0	82.1	81.5	80.4	7466	85.2
2010	3446.8	436	91.5	85.3	91.0	82.9	90.2	81.3	8074	92.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1998 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		121			59	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	559			920		
D. Inspection, maintenance or repair without refuelling				31		
H. Nuclear regulatory requirements				21		
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			7		5	0
L. Human factor related					7	
Subtotal	559	121	7	972	73	3
Total		687			1048	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1998 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		29
12. Reactor I&C Systems		5
14. Safety Systems		10
15. Reactor Cooling Systems		1
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		3
41. Main Generator Systems		1
42. Electrical Power Supply Systems	121	7
Total	121	56

SK-7 MOCHOVCE-2

Operator: SE,plc (Slovenské elektrárne, a.s.)

Contractor: SKODA (SKODA CONCERN NUCLEAR POWER PLANT WORKS)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 436.0 MW(e)
Design Net Capacity: 387.0 MW(e)
Design Discharge Burnup: 44000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3189.9 GW(e).h
Energy Availability Factor: 84.4%
Load Factor: 83.5%
Operating Factor: 86.5%
Energy Unavailability Factor: 15.6%
Total Off-line Time: 1186 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	322.2	287.5	316.7	310.6	317.5	301.9	310.2	318.7	246.3	0.0	145.2	313.2	3189.9
EAF (%)	100.0	100.0	99.3	98.7	99.6	97.7	98.1	97.7	78.8	0.0	47.2	96.6	84.4
UCF (%)	100.0	100.0	99.3	98.7	100.0	99.1	99.9	99.6	83.2	0.0	47.3	96.8	85.2
LF (%)	99.3	98.1	97.7	98.9	97.9	96.2	95.6	98.2	78.5	0.0	46.3	96.6	83.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.6	0.0	55.1	100.0	86.5
EUf (%)	0.0	0.0	0.7	1.3	0.4	2.3	1.9	2.3	21.2	100.0	52.8	3.4	15.6
PUf (%)	0.0	0.0	0.7	0.7	0.0	0.9	0.1	0.5	16.8	100.0	47.9	0.0	14.1
UCLF (%)	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	4.8	3.2	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.4	1.3	1.8	1.8	4.4	0.0	0.0	0.2	0.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SECOND UNIT OF NPP MOCHOVCE WAS OPERATED AT FULL POWER IN A BASE LOAD MODE. A LOAD-FOLLOWING HAS BEEN REQUIRED BY DISPATCHER FOR A PERIOD. UNIT PROVIDES GRID SUPPORTING SERVICES – PRIMARY, SECONDARY POWER CONTROL FOR GRID ADJUSTMENT AND TERTIARY POWER CONTROL. OVER THE REPORTING PERIOD THERE WERE APPROXIMATELY 2.5 EFPD LOSSES DUE TO FORCED UNPLANNED EVENTS. THE BIGGEST UNPLANNED OUTAGES WERE RECORDED IN NOVEMBER WHEN MANUAL TG21 WAS SHUT DOWN DUE TO LEAKAGE AT THE TURBINE OIL CONTROL SYSTEM. CONSEQUENTLY ANOTHER MANUAL TG21 SHUT DOWN WERE DONE BECAUSE OF FIRE AT THE HIGH PRESSURE PART ISOLATION. PLANNED EXTENDED GENERAL OVERHAUL WAS ACCOMPLISHED WITH AN ADVANCE OF 3.6 DAYS. DUE TO PROGRESS OF TUBES UNTIGHTNESS SEVERAL POWER REDUCTIONS WERE EFFECTED FOR CONDENSER REVISION AND LEAKAGE REPAIR. THROUGHOUT THE YEAR THERE WERE NOT ANY DELAYS OF THE PLANNED OUTAGES NEITHER THE LOSSES DUE TO GRID PROBLEMS. OTHER FACTORS AFFECTING ENERGY GENERATION OVER THE REPORTING PERIOD WERE LIMITATIONS DUE TO FUEL MANAGEMENT, COAST-DOWN OPERATION AND ENVIRONMENTAL CONDITIONS (COOLING WATER TEMPERATURE LIMITS).

5. Historical Summary

Date of Construction Start: 13/10/1983 **Lifetime Generation:** 31391.8 GW(e).h
Date of First Criticality: 12 Jan 1999 **Cumulative Energy Availability Factor:** 84.0%
Date of Grid Connection: 20/12/1999 **Cumulative Load Factor:** 79.9%
Date of Commercial Operation: 04 Nov 2000 **Cumulative Unit Capability Factor:** 85.6%
Cumulative Energy Unavailability Factor: 16.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2000	2222.5	404	91.6	91.6	87.9	87.9	83.3	83.3	5912	89.6
2001	2540.9	404	78.2	83.9	72.1	78.9	71.8	76.8	6967	79.5
2002	2498.4	405	76.0	81.0	71.7	76.3	70.4	74.5	6862	78.3
2003	2964.9	405	87.8	82.9	87.4	79.2	83.6	76.9	7729	88.2
2004	2034.5	405	81.6	82.6	81.4	79.7	57.2	72.7	7210	82.1
2005	3050.9	405	89.5	83.8	88.5	81.2	86.0	75.0	7900	90.2
2006	2787.2	405	82.1	83.5	81.1	81.2	78.6	75.6	7254	82.8
2007	3191.3	405	91.3	84.5	90.8	82.4	90.0	77.4	8082	92.3
2008	3070.5	436	88.3	85.0	87.9	83.1	85.2	78.3	7797	88.8
2009	3414.9	436	91.5	85.7	90.9	83.9	89.4	79.5	8128	92.8
2010	3189.9	436	85.2	85.6	84.4	84.0	83.5	79.9	7574	86.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2000 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					57	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1185			852		
D. Inspection, maintenance or repair without refuelling				126		
L. Human factor related					3	
Subtotal	1185	0	0	978	60	0
Total		1185			1038	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2000 to 2010 Average Hours Lost Per Year
13. Reactor Auxiliary Systems		6
15. Reactor Cooling Systems		30
16. Steam generation systems		4
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries		2
33. Circulating Water System		1
41. Main Generator Systems		6
42. Electrical Power Supply Systems		3
Total	0	54

SI-1 KRSKO

Operator: NEK (Nuklerana elektrarna Krško)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 666.0 MW(e)
Design Net Capacity: 632.0 MW(e)
Design Discharge Burnup: 44029 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5380.7 GW(e).h
Energy Availability Factor: 89.3%
Load Factor: 92.2%
Operating Factor: 89.9%
Energy Unavailability Factor: 10.7%
Total Off-line Time: 884 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	504.6	467.5	517.2	499.5	515.5	494.4	498.7	507.0	474.7	0.0	383.4	518.1	5380.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.4	0.0	77.3	100.0	89.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.5	0.0	77.3	100.0	89.3
LF (%)	101.8	104.5	104.5	104.2	104.0	103.1	100.7	102.3	99.0	0.0	80.0	104.6	92.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.9	0.0	83.8	100.0	89.9
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	100.0	22.7	0.0	10.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	97.9	6.5	0.0	9.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	16.3	0.0	1.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

ANNUAL OUTAGE WITH REFUELLING.

5. Historical Summary

Date of Construction Start: 30/03/1975 **Lifetime Generation:** 133219.1 GW(e).h
Date of First Criticality: 09 Nov 1981 **Cumulative Energy Availability Factor:** 84.0%
Date of Grid Connection: 10 Feb 1981 **Cumulative Load Factor:** 83.1%
Date of Commercial Operation: 01 Jan 1983 **Cumulative Unit Capability Factor:** 85.3%
Cumulative Energy Unavailability Factor: 16.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	3724.1	632	69.6	69.6	69.6	69.6	67.3	67.3	6255	71.4
1984	4207.6	632	79.8	74.7	79.8	74.7	75.8	71.5	7073	80.5
1985	3845.3	632	72.1	73.8	72.1	73.8	69.5	70.8	6421	73.3
1986	3822.0	620	74.8	74.1	73.7	73.8	70.4	70.7	6561	74.9
1987	4278.8	620	83.5	76.0	83.5	75.7	78.8	72.3	7287	83.2
1988	3935.8	620	77.0	76.1	76.9	75.9	72.3	72.3	6866	78.2
1989	4453.9	620	85.5	77.4	85.2	77.2	82.0	73.7	7500	85.6
1990	4386.8	620	87.1	78.6	85.4	78.3	80.8	74.6	7592	86.7
1991	4718.2	632	94.6	80.4	88.7	79.4	85.2	75.8	8133	92.8
1992	3767.2	632	74.0	79.8	68.6	78.3	67.9	75.0	6699	76.3
1993	3762.8	620	72.5	79.1	69.3	77.5	69.3	74.4	6493	74.1
1994	4403.5	620	82.1	79.4	81.1	77.8	81.1	75.0	7402	84.5
1995	4568.5	620	85.1	79.8	84.1	78.3	84.1	75.7	7606	86.8
1996	4361.6	620	79.6	79.8	79.6	78.4	80.1	76.0	7143	81.3
1997	4794.0	620	88.3	80.4	87.8	79.0	88.3	76.8	7824	89.3
1998	4793.6	620	89.5	80.9	88.0	79.6	88.3	77.5	7913	90.3
1999	4492.4	620	84.7	81.2	82.4	79.7	82.7	77.8	7480	85.4
2000	4548.8	646	82.6	81.2	80.5	79.8	80.1	78.0	7295	83.0
2001	5036.3	656	88.4	81.6	86.2	80.1	87.6	78.5	7790	88.9
2002	5308.8	676	92.0	82.2	91.1	80.7	89.6	79.1	8111	92.6
2003	4963.3	676	91.6	82.7	86.2	81.0	83.8	79.3	8084	92.3
2004	5212.2	676	91.4	83.1	89.9	81.4	87.8	79.7	8081	92.0
2005	5613.7	656	98.5	83.8	98.3	82.2	97.7	80.6	8664	98.9
2006	5289.5	656	90.1	84.1	89.9	82.5	91.3	81.0	7883	90.0
2007	5428.2	666	91.0	84.4	90.9	82.9	93.0	81.5	7989	91.2
2008	5972.0	666	98.6	84.9	98.6	83.5	102.1	82.3	8660	98.6
2009	5459.7	666	90.8	85.1	90.8	83.8	93.6	82.8	7992	91.2
2010	5380.7	666	89.3	85.3	89.3	84.0	92.2	83.1	7876	89.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		133			126	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	751			875		
D. Inspection, maintenance or repair without refuelling				160		
E. Testing of plant systems or components				50	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				23		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						0
L. Human factor related					0	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					1	
Subtotal	751	133	0	1108	128	0
Total		884			1236	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems		2
14. Safety Systems		3
15. Reactor Cooling Systems		14
16. Steam generation systems		14
31. Turbine and auxiliaries	133	27
32. Feedwater and Main Steam System		39
33. Circulating Water System		1
35. All other I&C Systems		0
41. Main Generator Systems		4
42. Electrical Power Supply Systems		14
Total	133	122

ZA-1 KOEBERG-1

Operator: ESKOM (ESKOM)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 900.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 36500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5291.7 GW(e).h
Energy Availability Factor: 67.8%
Load Factor: 67.1%
Operating Factor: 69.5%
Energy Unavailability Factor: 32.2%
Total Off-line Time: 2675 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	667.7	602.4	509.6	644.9	667.4	644.5	663.2	432.7	0.0	0.0	64.8	394.5	5291.7
EAF (%)	100.0	99.7	77.5	100.0	100.0	100.0	100.0	65.4	0.0	0.0	12.6	60.1	67.8
UCF (%)	100.0	100.0	77.5	100.0	100.0	100.0	100.0	71.3	0.0	0.0	12.6	60.1	68.4
LF (%)	99.7	99.6	76.1	99.5	99.7	99.5	99.0	64.6	0.0	0.0	10.0	58.9	67.1
OF (%)	100.0	100.0	78.6	100.0	100.0	100.0	100.0	71.2	0.0	0.0	24.6	60.3	69.5
EUf (%)	0.0	0.3	22.5	0.0	0.0	0.0	0.3	34.6	100.0	100.0	87.4	39.9	32.2
PUF (%)	0.0	0.0	13.9	0.0	0.0	0.0	0.0	28.7	100.0	97.1	8.7	0.2	20.8
UCLF (%)	0.0	0.0	8.5	0.0	0.0	0.0	0.0	0.0	0.0	2.9	78.7	39.7	10.8
XUF (%)	0.0	0.3	0.0	0.0	0.0	0.0	0.3	5.9	0.0	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 07 Jan 1976
Date of First Criticality: 14/03/1984
Date of Grid Connection: 04 Apr 1984
Date of Commercial Operation: 21/07/1984

Lifetime Generation: 145543.7 GW(e).h
Cumulative Energy Availability Factor: 71.1%
Cumulative Load Factor: 68.7%
Cumulative Unit Capability Factor: 75.6%
Cumulative Energy Unavailability Factor: 28.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	3441.3	920	90.6	90.6	88.8	88.8	84.7	84.7	4110	93.1
1985	4004.3	920	53.5	65.9	53.5	65.3	49.7	61.4	4986	56.9
1986	3419.0	922	53.6	61.0	53.6	60.6	42.3	53.8	4575	52.2
1987	2864.5	920	61.6	61.2	61.6	60.9	35.5	48.6	4337	49.5
1988	5964.4	920	76.0	64.5	76.0	64.3	73.8	54.2	6791	77.3
1989	4498.1	922	63.2	64.2	63.2	64.1	55.2	54.4	5655	64.0
1990	3852.1	920	61.7	63.9	52.7	62.3	47.8	53.4	5360	61.2
1991	5976.8	920	76.3	65.5	74.6	64.0	74.2	56.1	6886	78.6
1992	3992.5	920	63.6	65.3	50.3	62.4	49.4	55.3	5697	64.9
1993	4097.9	920	66.4	65.4	50.5	61.1	50.8	54.9	6010	68.6
1994	5933.9	920	95.6	68.3	74.9	62.4	73.6	56.7	8422	96.1
1995	4576.9	920	65.7	68.1	56.8	61.9	56.7	56.7	5853	66.8
1996	5672.8	920	81.8	69.2	70.4	62.6	70.2	57.7	7260	82.7
1997	6610.7	920	87.4	70.5	82.3	64.1	82.0	59.5	7676	87.6
1998	7248.3	920	97.6	72.4	90.1	65.9	89.9	61.6	8552	97.6
1999	7051.7	920	88.1	73.4	83.3	67.0	87.5	63.3	7848	89.6
2000	5629.2	920	73.4	73.4	70.2	67.2	69.8	63.7	7250	82.7
2001	6042.5	920	83.0	73.9	77.1	67.7	75.0	64.3	7303	83.4
2002	7328.6	900	95.2	75.1	93.1	69.1	93.0	65.9	8417	96.1
2003	6413.4	900	84.1	75.5	81.9	69.7	81.3	66.6	7398	84.5
2004	6388.0	900	81.6	75.8	81.1	70.3	80.8	67.3	7358	83.8
2005	5821.0	900	76.8	75.8	74.7	70.5	73.8	67.6	6726	76.8
2006	4682.8	900	61.0	75.2	59.8	70.0	59.4	67.2	5435	62.0
2007	5747.0	900	74.4	75.2	73.6	70.2	72.9	67.5	6609	75.4
2008	7691.9	900	98.3	76.1	98.3	71.3	97.3	68.7	8689	98.9
2009	5468.0	900	71.1	75.9	70.1	71.2	69.4	68.7	6307	72.0
2010	5291.7	900	68.4	75.6	67.8	71.1	67.1	68.7	6085	69.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		922			329	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling	1656			1165	11	
D. Inspection, maintenance or repair without refuelling	96			178		
E. Testing of plant systems or components				4	0	13
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				59	29	
L. Human factor related					0	
Z. Others					21	
Subtotal	1752	922	0	1406	398	13
Total		2674			1817	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	295	0
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		1
14. Safety Systems		3
15. Reactor Cooling Systems		52
16. Steam generation systems		0
31. Turbine and auxiliaries	564	41
32. Feedwater and Main Steam System		24
33. Circulating Water System	62	2
41. Main Generator Systems		152
42. Electrical Power Supply Systems		44
Total	921	325

ZA-2 KOEBERG-2

Operator: ESKOM (ESKOM)
Contractor: FRAM (FRAMATOME)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 900.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 36500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7608.2 GW(e).h
Energy Availability Factor: 98.0%
Load Factor: 96.5%
Operating Factor: 97.8%
Energy Unavailability Factor: 2.0%
Total Off-line Time: 195 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	664.5	599.1	664.5	452.7	666.1	644.5	639.5	667.1	636.4	664.1	643.5	666.2	7608.2
EAFF (%)	100.0	99.6	100.0	80.7	100.0	100.0	95.9	100.0	100.0	100.0	100.0	100.0	98.0
UCF (%)	100.0	100.0	100.0	80.7	100.0	100.0	95.9	100.0	100.0	100.0	100.0	100.0	98.1
LF (%)	99.2	99.0	99.2	69.9	99.5	99.5	95.5	99.6	98.2	99.2	99.3	99.5	96.5
OF (%)	100.0	100.0	100.0	73.1	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0	97.8
EUUF (%)	0.0	0.4	0.0	19.3	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	2.0
PUF (%)	0.0	0.0	0.0	19.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.3
XUF (%)	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

A LOAD FACTOR OF 96.5%

5. Historical Summary

Date of Construction Start: 07 Jan 1976 Lifetime Generation: 141232.2 GW(e).h
Date of First Criticality: 07 Jul 1985 Cumulative Energy Availability Factor: 71.0%
Date of Grid Connection: 25/07/1985 Cumulative Load Factor: 69.7%
Date of Commercial Operation: 11 Sep 1985 Cumulative Unit Capability Factor: 77.7%
Cumulative Energy Unavailability Factor: 29.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	483.7	920	37.2	37.2	37.2	37.2	35.9	35.9	555	37.9
1986	5409.0	922	67.4	63.1	67.3	63.0	67.0	62.5	5969	68.1
1987	3352.8	920	48.6	56.4	48.6	56.4	41.6	52.9	4193	47.9
1988	4552.7	920	63.1	58.5	63.1	58.5	56.3	54.0	5626	64.0
1989	6620.2	922	89.2	65.9	89.2	65.9	81.3	60.6	8115	91.9
1990	4614.3	920	64.8	65.7	58.4	64.5	57.3	59.9	5933	67.7
1991	3191.9	920	56.3	64.2	40.3	60.6	39.6	56.6	5067	57.8
1992	5308.1	920	94.9	68.5	66.3	61.4	65.7	57.9	8439	96.1
1993	3212.3	920	52.6	66.5	40.4	58.8	39.9	55.7	4654	53.1
1994	3755.9	920	69.2	66.8	49.5	57.8	46.6	54.7	5944	67.9
1995	6710.5	920	98.6	69.9	83.2	60.3	83.3	57.5	8640	98.6
1996	6084.9	920	81.5	71.0	75.8	61.7	75.3	59.1	7177	81.7
1997	6016.4	920	83.8	72.0	75.2	62.8	74.7	60.4	7409	84.6
1998	6333.0	920	81.3	72.7	79.0	64.0	78.6	61.8	7194	82.1
1999	6413.9	920	86.2	73.7	75.7	64.8	79.6	63.0	7509	85.7
2000	7365.9	920	98.1	75.3	91.2	66.6	91.1	64.9	8687	98.9
2001	4662.8	920	66.5	74.8	60.1	66.2	57.9	64.4	5461	62.3
2002	4688.8	900	60.6	73.9	59.6	65.8	59.5	64.2	5439	62.1
2003	6255.5	900	82.9	74.4	79.4	66.5	79.3	65.0	7150	81.6
2004	7896.7	900	99.8	75.7	99.8	68.2	99.9	66.8	8784	100.0
2005	6416.8	900	84.2	76.1	81.5	68.9	81.4	67.5	7330	83.7
2006	5391.4	900	81.3	76.4	71.4	69.0	68.4	67.5	7003	79.9
2007	6853.9	900	95.3	77.2	87.3	69.8	86.9	68.4	8422	96.1
2008	5055.9	900	66.2	76.7	64.2	69.6	64.0	68.2	5960	67.9
2009	6105.8	900	79.4	76.9	77.9	69.9	77.4	68.6	7079	80.8
2010	7608.2	900	98.1	77.7	98.0	71.0	96.5	69.7	8565	97.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					438	16
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling				1119	37	
D. Inspection, maintenance or repair without refuelling	127			42		
E. Testing of plant systems or components				51	1	
G. Major back-fitting, refurbishment or upgrading activities without refuelling						0
H. Nuclear regulatory requirements					1	
J. Grid limitation, failure or grid unavailability			91		0	14
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					93	3
L. Human factor related					4	
Subtotal	127	0	91	1212	582	33
Total		218			1827	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		12
14. Safety Systems		70
15. Reactor Cooling Systems		14
16. Steam generation systems		55
31. Turbine and auxiliaries		28
32. Feedwater and Main Steam System		21
33. Circulating Water System		3
35. All other I&C Systems		2
41. Main Generator Systems		47
42. Electrical Power Supply Systems		195
XX. Miscellaneous Systems		3
Total	0	450

ES-6 ALMARAZ-1

Operator: CNAT (CENTRALES NUCLEARES ALMARAZ-TRILLO(ID/UFG/ENDESA/HC/NUCLENOR))
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010: 944.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 58000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7884.3 GW(e).h
Energy Availability Factor: 89.7%
Load Factor: 89.7%
Operating Factor: 93.0%
Energy Unavailability Factor: 10.3%
Total Off-line Time: 613 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	258.2	406.6	691.6	698.4	726.7	713.5	727.3	732.6	710.1	742.6	724.9	751.8	7884.3
EAF (%)	36.7	59.9	92.2	96.0	96.7	98.1	97.0	97.7	97.8	98.9	99.9	100.0	89.7
UCF (%)	36.7	59.9	92.2	96.3	97.0	99.3	99.3	100.0	100.0	100.0	100.0	100.0	90.5
LF (%)	36.8	59.9	92.2	96.0	96.7	98.1	97.0	97.7	97.8	98.9	99.9	100.2	89.7
OF (%)	49.9	64.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	93.0
EUF (%)	63.3	40.1	7.8	4.0	3.3	1.9	3.0	2.3	2.2	1.1	0.1	0.0	10.3
PUF (%)	63.3	1.6	7.7	3.7	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4
UCLF (%)	0.0	38.5	0.1	0.0	0.0	0.7	0.7	0.0	0.0	0.0	0.0	0.0	3.1
XUF (%)	0.0	0.0	0.0	0.3	0.3	1.2	2.3	2.3	2.2	1.1	0.1	0.0	0.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Mar 1973 **Lifetime Generation:** 194638.0 GW(e).h
Date of First Criticality: 04 May 1981 **Cumulative Energy Availability Factor:** 85.5%
Date of Grid Connection: 05 Jan 1981 **Cumulative Load Factor:** 85.7%
Date of Commercial Operation: 09 Jan 1983 **Cumulative Unit Capability Factor:** 86.4%
Cumulative Energy Unavailability Factor: 14.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2135.5	930	78.4	78.4	78.4	78.4	78.4	78.4	2597	88.7
1984	4820.5	893	65.0	68.5	65.0	68.5	61.5	65.8	6062	69.0
1985	4825.2	900	61.6	65.6	61.6	65.6	61.2	63.8	5705	65.1
1986	5425.0	900	69.3	66.7	69.3	66.7	68.8	65.3	6418	73.3
1987	7193.7	900	92.5	72.6	92.5	72.6	91.2	71.3	8346	95.3
1988	5879.6	900	74.6	73.0	74.6	73.0	74.4	71.9	6899	78.5
1989	6562.2	895	83.2	74.6	83.2	74.6	83.7	73.7	7640	87.2
1990	6460.7	895	82.2	75.6	82.2	75.6	82.4	74.9	7451	85.1
1991	7481.7	895	96.2	78.1	96.2	78.1	95.4	77.4	8589	98.0
1992	6379.1	895	80.8	78.4	80.8	78.4	81.1	77.8	7387	84.1
1993	6530.9	895	85.1	79.0	83.2	78.8	83.3	78.3	7663	87.5
1994	7448.6	895	95.9	80.5	95.1	80.3	95.0	79.8	8495	97.0
1995	6588.5	895	86.2	81.0	83.7	80.5	84.0	80.1	7709	88.0
1996	5904.3	895	73.8	80.4	72.5	79.9	75.1	79.7	6789	77.3
1997	6642.8	895	83.0	80.6	79.6	79.9	84.7	80.1	7371	84.1
1998	8032.5	944	98.8	81.8	97.1	81.1	97.1	81.2	8760	100.0
1999	6988.6	927	85.4	82.1	84.7	81.3	86.1	81.6	7613	86.9
2000	7471.6	927	91.1	82.6	90.3	81.9	91.8	82.2	8014	91.2
2001	8151.4	927	99.6	83.6	99.0	82.8	100.4	83.2	8749	99.9
2002	7428.0	944	92.2	84.0	90.4	83.2	89.8	83.5	8100	92.5
2003	7499.1	944	93.8	84.5	91.6	83.6	90.7	83.9	8233	94.0
2004	8185.7	944	99.9	85.3	99.2	84.4	98.7	84.6	8784	100.0
2005	7519.4	944	93.1	85.6	91.4	84.7	90.9	84.9	8180	93.4
2006	7152.4	944	88.1	85.7	86.5	84.8	86.5	85.0	7831	89.4
2007	8189.8	944	99.9	86.3	99.0	85.4	99.0	85.6	8760	100.0
2008	7190.8	944	87.2	86.4	86.6	85.5	86.7	85.6	7725	87.9
2009	6880.1	944	83.7	86.3	82.9	85.4	83.2	85.5	7336	83.7
2010	7884.3	1008	90.5	86.4	89.7	85.5	89.7	85.7	8147	93.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		240		4	120	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	372			748		
D. Inspection, maintenance or repair without refuelling				195		
E. Testing of plant systems or components				58	0	
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
L. Human factor related					2	
Subtotal	372	240	0	1005	124	0
Total		612			1129	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		38
15. Reactor Cooling Systems		16
16. Steam generation systems	162	0
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System		22
33. Circulating Water System		1
41. Main Generator Systems	78	6
42. Electrical Power Supply Systems		22
Total	240	122

ES-7 ALMARAZ-2

Operator: CNAT (CENTRALES NUCLEARES ALMARAZ-TRILLO(ID/UFG/ENDESA/HC/NUCLENOR))
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010: 956.0 MW(e)
Design Net Capacity: 930.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7007.0 GW(e).h
Energy Availability Factor: 83.8%
Load Factor: 83.7%
Operating Factor: 86.4%
Energy Unavailability Factor: 16.2%
Total Off-line Time: 1188 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	710.9	640.0	704.9	647.5	699.0	665.0	643.9	673.6	475.8	690.9	455.5	0.0	7007.0
EAF (%)	100.0	100.0	100.0	94.1	98.3	96.6	90.6	94.7	69.2	97.0	66.2	0.0	83.8
UCF (%)	100.0	100.0	100.0	95.4	100.0	99.2	94.1	98.6	72.6	100.0	67.3	0.0	85.5
LF (%)	99.9	99.6	99.2	94.1	98.3	96.6	90.5	94.7	69.1	97.0	66.2	0.0	83.7
OF (%)	100.0	100.0	100.0	98.6	100.0	100.0	97.2	98.9	75.8	100.0	67.9	0.0	86.4
EUF (%)	0.0	0.0	0.0	5.9	1.7	3.4	9.4	5.3	30.8	3.0	33.8	100.0	16.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.7	100.0	11.2
UCLF (%)	0.0	0.0	0.0	4.6	0.0	0.8	5.9	1.4	27.5	0.0	0.0	0.0	3.3
XUF (%)	0.0	0.0	0.0	1.2	1.7	2.6	3.5	3.9	3.4	3.0	1.1	0.0	1.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

ON NOVEMBER 21 BEGAN THE NINETEENTH FOR REFUELLING, MAINTENANCE AND POWER INCREASE OF 108%.

5. Historical Summary

Date of Construction Start: 07 Mar 1973 **Lifetime Generation:** 190338.0 GW(e).h
Date of First Criticality: 19/09/1983 **Cumulative Energy Availability Factor:** 86.9%
Date of Grid Connection: 10 Aug 1983 **Cumulative Load Factor:** 87.2%
Date of Commercial Operation: 07 Jan 1984 **Cumulative Unit Capability Factor:** 88.0%
Cumulative Energy Unavailability Factor: 13.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	3204.9	893	86.0	86.0	86.0	86.0	81.3	81.3	3989	90.3
1985	6236.1	900	79.8	81.9	79.8	81.9	79.1	79.8	7297	83.3
1986	5825.2	900	75.2	79.2	75.2	79.2	73.9	77.4	7136	81.5
1987	6402.5	900	81.8	80.0	81.8	80.0	81.2	78.5	7351	83.9
1988	6809.4	900	86.3	81.4	86.3	81.4	86.1	80.2	7838	89.2
1989	6545.7	895	82.8	81.6	82.8	81.6	83.5	80.8	7638	87.2
1990	7649.3	895	97.4	84.0	97.4	84.0	97.6	83.4	8652	98.8
1991	6812.9	895	85.4	84.2	85.4	84.2	86.9	83.8	7712	88.0
1992	6892.7	895	87.3	84.6	87.3	84.6	87.7	84.3	7997	91.0
1993	7710.1	895	99.0	86.1	98.5	86.0	98.3	85.8	8760	100.0
1994	6384.6	895	84.2	85.9	80.9	85.6	81.4	85.4	7562	86.3
1995	6814.7	895	89.1	86.2	86.2	85.6	86.9	85.5	7952	90.8
1996	7273.3	895	91.6	86.6	91.5	86.1	92.5	86.1	8108	92.3
1997	6042.5	895	76.6	85.9	72.6	85.1	77.1	85.4	6811	77.8
1998	5892.4	953	75.9	85.2	70.2	84.0	70.6	84.3	6810	77.7
1999	8126.6	936	98.0	86.0	97.4	84.9	99.1	85.3	8743	99.8
2000	7401.8	936	90.6	86.3	88.5	85.1	90.0	85.6	8160	92.9
2001	7601.5	936	92.1	86.6	91.3	85.5	92.7	86.0	8189	93.5
2002	8154.9	953	98.8	87.3	98.1	86.2	97.7	86.7	8760	100.0
2003	6627.9	953	81.9	87.0	79.9	85.9	79.4	86.3	7391	84.4
2004	7563.2	953	91.6	87.3	90.9	86.1	90.3	86.5	8083	92.0
2005	8253.3	956	100.0	87.9	99.2	86.8	98.6	87.1	8760	100.0
2006	7250.1	956	87.7	87.9	86.8	86.8	86.6	87.1	7747	88.4
2007	7191.7	956	87.1	87.9	86.0	86.7	85.9	87.0	7668	87.5
2008	8331.7	956	100.0	88.4	99.2	87.3	99.2	87.5	8784	100.0
2009	6864.6	956	82.9	88.1	82.0	87.0	82.0	87.3	7367	84.1
2010	7007.0	956	85.5	88.0	83.8	86.9	83.7	87.2	7572	86.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		209			130	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	975			627	6	
D. Inspection, maintenance or repair without refuelling				22		
E. Testing of plant systems or components				30		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	
L. Human factor related		10			0	
Z. Others					4	
Subtotal	975	219	0	679	153	0
Total		1194			832	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		9
13. Reactor Auxiliary Systems		3
14. Safety Systems		1
15. Reactor Cooling Systems	188	4
16. Steam generation systems		22
31. Turbine and auxiliaries	21	30
32. Feedwater and Main Steam System		22
35. All other I&C Systems		0
41. Main Generator Systems		4
42. Electrical Power Supply Systems		31
Total	209	126

ES-8 ASCO-1

Operator: ANAV (ASOCIACION NUCLEAR ASCO-VANDELLOS A.I.E. (ENDESA/ID))
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 995.0 MW(e)
Design Net Capacity: 888.0 MW(e)
Design Discharge Burnup: 50500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7996.1 GW(e).h
Energy Availability Factor: 91.7%
Load Factor: 91.7%
Operating Factor: 94.0%
Energy Unavailability Factor: 8.3%
Total Off-line Time: 529 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	196.9	663.2	728.3	709.5	714.3	706.5	718.3	714.5	691.4	721.9	699.4	731.9	7996.1
EAF (%)	26.6	99.2	98.5	99.0	96.5	98.6	97.0	96.5	96.5	97.4	97.6	98.9	91.7
UCF (%)	26.9	99.8	99.1	99.8	97.3	99.8	99.8	99.8	99.8	99.8	99.7	99.8	93.3
LF (%)	26.6	99.2	98.5	99.0	96.5	98.6	97.0	96.5	96.5	97.4	97.6	98.9	91.7
OF (%)	30.4	100.0	100.0	100.0	98.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.0
EUF (%)	73.4	0.8	1.5	1.0	3.5	1.4	3.0	3.5	3.5	2.6	2.4	1.1	8.3
PUF (%)	0.0	0.2	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
UCLF (%)	73.1	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	6.4
XUF (%)	0.3	0.6	0.5	0.7	0.8	1.2	2.8	3.3	3.3	2.4	2.1	0.9	1.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

SCRAM DUE TO LOSS OF VACUUM ON THE CONDENSER.

5. Historical Summary

Date of Construction Start: 16/05/1974 **Lifetime Generation:** 185622.8 GW(e).h
Date of First Criticality: 16/06/1983 **Cumulative Energy Availability Factor:** 84.5%
Date of Grid Connection: 13/08/1983 **Cumulative Load Factor:** 83.6%
Date of Commercial Operation: 12 Oct 1984 **Cumulative Unit Capability Factor:** 85.1%
Cumulative Energy Unavailability Factor: 15.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	104.0	887	20.0	20.0	20.0	20.0	15.8	15.8	161	21.6
1985	4429.4	898	60.3	57.2	60.3	57.2	56.3	53.2	5342	61.0
1986	5129.0	898	68.2	62.5	68.2	62.5	65.2	58.9	6208	70.9
1987	6392.0	898	84.3	69.5	83.7	69.3	81.3	66.2	7569	86.4
1988	6669.0	898	84.1	73.1	84.1	73.0	84.5	70.7	7599	86.5
1989	6750.0	930	86.1	75.7	86.0	75.6	82.9	73.1	7771	88.7
1990	6642.0	930	84.5	77.2	84.5	77.1	81.5	74.6	7699	87.9
1991	6836.0	930	87.2	78.6	87.0	78.5	83.9	75.9	7810	89.2
1992	6875.0	887	86.5	79.6	86.5	79.5	88.2	77.4	7898	89.9
1993	6599.0	930	83.3	80.0	83.2	79.9	81.0	77.8	7401	84.5
1994	6868.0	930	87.1	80.7	86.8	80.6	84.3	78.5	7758	88.6
1995	5708.0	900	70.7	79.8	70.4	79.7	72.4	77.9	6387	72.9
1996	7972.0	947	99.0	81.5	99.0	81.4	95.8	79.5	8755	99.7
1997	6411.0	915	80.5	81.4	77.6	81.1	80.0	79.5	7198	82.2
1998	7349.0	949	89.3	82.0	89.1	81.7	88.4	80.2	7943	90.7
1999	8147.0	945	99.0	83.2	98.7	82.8	98.4	81.4	8741	99.8
2000	7681.0	979	89.8	83.6	89.5	83.3	89.3	81.9	8008	91.2
2001	7798.0	991	90.3	84.0	89.8	83.7	89.8	82.4	8056	92.0
2002	8397.0	998	98.2	84.9	97.6	84.5	96.0	83.2	8737	99.7
2003	7581.1	996	88.0	85.0	87.3	84.7	86.9	83.4	7900	90.2
2004	7734.3	995	89.2	85.3	88.6	84.9	88.5	83.7	7949	90.5
2005	7640.5	995	89.0	85.4	88.2	85.0	87.7	83.9	8548	97.6
2006	7418.4	995	87.1	85.5	85.4	85.1	85.1	83.9	7971	91.0
2007	7574.8	995	88.6	85.7	87.4	85.2	86.9	84.1	7876	89.9
2008	7436.3	995	86.3	85.7	85.2	85.2	85.1	84.1	7768	88.4
2009	5499.8	995	64.4	84.8	63.1	84.2	63.1	83.2	5758	65.7
2010	7996.1	995	93.3	85.1	91.7	84.5	91.7	83.6	8231	94.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		517			276	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling				782	16	
D. Inspection, maintenance or repair without refuelling				34		
E. Testing of plant systems or components				60	4	
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	0
L. Human factor related		11		6	1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					1	
Subtotal	0	528	0	882	308	5
Total		528			1195	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1983 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		11
16. Steam generation systems		9
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		9
31. Turbine and auxiliaries	517	49
32. Feedwater and Main Steam System		11
35. All other I&C Systems		1
41. Main Generator Systems		85
42. Electrical Power Supply Systems		90
XX. Miscellaneous Systems		2
Total	517	270

ES-9 ASCO-2

Operator: ANAV (ASOCIACION NUCLEAR ASCO-VANDELLOS A.I.E. (ENDESA/ID))
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 997.0 MW(e)
Design Net Capacity: 888.0 MW(e)
Design Discharge Burnup: 50500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7309.1 GW(e).h
Energy Availability Factor: 83.7%
Load Factor: 83.7%
Operating Factor: 86.6%
Energy Unavailability Factor: 16.3%
Total Off-line Time: 1177 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	732.3	661.9	731.5	707.7	155.0	73.3	713.7	707.8	686.4	717.4	694.4	727.8	7309.1
EAF (%)	98.7	98.8	98.7	98.6	20.9	10.2	96.2	95.4	95.6	96.6	96.7	98.1	83.7
UCF (%)	99.6	99.6	99.5	99.5	21.0	10.5	99.7	99.8	99.7	99.8	99.8	99.4	85.6
LF (%)	98.7	98.8	98.7	98.6	20.9	10.2	96.2	95.4	95.6	96.6	96.7	98.1	83.7
OF (%)	100.0	100.0	100.0	100.0	22.7	16.4	100.0	100.0	100.0	100.0	100.0	100.0	86.6
EUf (%)	1.3	1.2	1.3	1.4	79.1	89.8	3.8	4.6	4.4	3.4	3.3	1.9	16.3
PUF (%)	0.4	0.4	0.5	0.5	79.0	69.3	0.3	0.2	0.3	0.2	0.3	0.4	12.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	0.0	0.0	0.3	1.7
XUF (%)	0.9	0.8	0.7	0.9	0.1	0.3	3.5	4.4	4.1	3.2	3.0	1.3	1.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

NO SCRAMS DURING THE YEAR.

5. Historical Summary

Date of Construction Start: 03 Jul 1975 **Lifetime Generation:** 179520.5 GW(e).h
Date of First Criticality: 09 Nov 1985 **Cumulative Energy Availability Factor:** 87.3%
Date of Grid Connection: 23/10/1985 **Cumulative Load Factor:** 86.1%
Date of Commercial Operation: 31/03/1986 **Cumulative Unit Capability Factor:** 88.2%
Cumulative Energy Unavailability Factor: 12.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	4977.0	898	79.3	79.3	79.3	79.3	75.5	75.5	5907	80.4
1987	5954.0	898	78.1	78.7	77.3	78.2	75.7	75.6	7035	80.3
1988	6865.0	898	88.2	82.0	86.8	81.2	87.0	79.6	7874	89.6
1989	6732.0	930	86.3	83.2	85.7	82.4	82.6	80.4	7729	88.2
1990	6933.0	930	90.4	84.7	90.4	84.1	85.1	81.4	7916	90.4
1991	6820.0	930	86.7	85.1	86.5	84.5	83.7	81.8	7799	89.0
1992	7077.0	953	89.9	85.8	89.9	85.3	84.5	82.2	8042	91.6
1993	7052.0	930	90.0	86.3	88.6	85.8	86.6	82.8	7897	90.1
1994	7085.0	930	89.8	86.7	89.5	86.2	87.0	83.3	7962	90.9
1995	6977.0	900	86.4	86.7	86.3	86.2	88.5	83.8	7674	87.6
1996	6011.0	963	75.6	85.6	75.1	85.1	71.1	82.6	6825	77.7
1997	7916.0	900	98.2	86.7	96.2	86.0	100.4	84.0	8725	99.6
1998	7399.0	946	90.6	87.0	89.9	86.3	89.3	84.4	8050	91.9
1999	7215.0	946	87.2	87.0	86.4	86.3	87.1	84.6	7854	89.7
2000	8451.0	983	98.6	87.8	98.6	87.2	97.9	85.6	8734	99.4
2001	7829.0	983	91.0	88.0	90.6	87.4	90.9	85.9	8102	92.5
2002	7780.0	997	90.8	88.2	89.4	87.6	89.1	86.1	8127	92.8
2003	8521.2	997	99.6	88.9	98.7	88.2	97.6	86.8	8738	99.7
2004	6909.3	997	80.2	88.4	79.6	87.7	78.9	86.4	7287	83.0
2005	7418.9	997	86.8	88.3	86.1	87.7	84.9	86.3	7779	88.8
2006	7968.7	997	94.3	88.6	92.4	87.9	91.2	86.5	8335	95.1
2007	7091.4	997	83.6	88.4	81.9	87.6	81.2	86.3	7532	86.0
2008	7123.6	997	83.3	88.1	82.0	87.4	81.3	86.1	7413	84.4
2009	7818.3	997	91.3	88.3	89.5	87.5	89.5	86.2	8082	92.3
2010	7309.1	997	85.6	88.2	83.7	87.3	83.7	86.1	7583	86.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		145			167	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1032			595	32	
D. Inspection, maintenance or repair without refuelling				33	24	
E. Testing of plant systems or components				19	3	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				19		
J. Grid limitation, failure or grid unavailability					2	6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				14	4	3
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Z. Others					1	
Subtotal	1032	145	0	680	234	11
Total		1177			925	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems		1
13. Reactor Auxiliary Systems		3
15. Reactor Cooling Systems		1
16. Steam generation systems		14
21. Fuel Handling and Storage Facilities	145	
31. Turbine and auxiliaries		12
32. Feedwater and Main Steam System		58
33. Circulating Water System		5
41. Main Generator Systems		0
42. Electrical Power Supply Systems		58
XX. Miscellaneous Systems		7
Total	145	163

ES-10 COFRENTES

Operator: ID (IBERDROLA, S.A.)

Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1064.0 MW(e)
 Design Net Capacity: 939.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9201.9 GW(e).h
 Energy Availability Factor: 98.7%
 Load Factor: 98.7%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 1.3%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	786.5	712.6	781.9	765.2	790.2	754.2	785.1	781.5	753.3	760.2	753.7	777.6	9201.9
EAF (%)	99.4	99.7	98.9	99.9	99.8	98.5	99.2	98.7	98.3	95.9	98.4	98.2	98.7
UCF (%)	99.4	99.7	99.0	100.0	100.0	98.8	100.0	99.5	98.8	96.0	98.5	98.3	99.0
LF (%)	99.3	99.7	98.9	99.9	99.8	98.5	99.2	98.7	98.3	95.9	98.4	98.2	98.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.6	0.3	1.1	0.1	0.2	1.5	0.8	1.3	1.7	4.1	1.6	1.8	1.3
PUF (%)	0.6	0.3	1.0	0.0	0.0	1.2	0.0	0.0	1.1	0.0	1.1	0.0	0.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	4.0	0.4	1.8	0.6
XUF (%)	0.0	0.0	0.1	0.1	0.2	0.4	0.8	0.8	0.5	0.1	0.1	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 09 Sep 1975 Lifetime Generation: 195384.2 GW(e).h
 Date of First Criticality: 23/08/1984 Cumulative Energy Availability Factor: 86.5%
 Date of Grid Connection: 14/10/1984 Cumulative Load Factor: 86.5%
 Date of Commercial Operation: 03 Nov 1985 Cumulative Unit Capability Factor: 87.4%
 Cumulative Energy Unavailability Factor: 13.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	5612.3	939	81.4	81.4	81.4	81.4	81.4	81.4	6444	87.7
1986	6668.3	939	82.0	81.7	81.1	81.2	81.1	81.2	7487	85.5
1987	6883.1	930	83.4	82.3	83.4	82.0	84.5	82.4	7615	86.9
1988	7142.2	930	85.7	83.2	85.5	82.9	87.4	83.7	7850	89.4
1989	7052.2	939	83.9	83.3	83.9	83.1	85.7	84.1	7732	88.3
1990	7070.3	939	85.1	83.6	85.1	83.5	86.0	84.4	7560	86.3
1991	6999.6	953	83.7	83.7	83.7	83.5	83.8	84.3	7660	87.4
1992	7712.1	939	91.9	84.7	91.9	84.6	93.5	85.5	8376	95.4
1993	7016.2	953	84.8	84.7	83.6	84.4	84.0	85.3	7579	86.5
1994	6990.9	953	85.1	84.7	83.5	84.4	83.7	85.2	7553	86.2
1995	8187.0	953	97.8	86.0	97.5	85.6	98.1	86.4	8683	99.1
1996	7687.5	953	91.9	86.5	90.9	86.0	91.8	86.8	8215	93.5
1997	6893.7	953	86.2	86.4	83.7	85.9	82.6	86.5	7668	87.5
1998	8174.1	993	96.6	87.2	96.6	86.7	94.0	87.1	8546	97.6
1999	7491.6	989	89.8	87.4	86.4	86.6	86.5	87.0	8004	91.4
2000	7348.1	989	86.9	87.4	84.6	86.5	84.6	86.9	7808	88.9
2001	8278.1	989	95.5	87.9	95.5	87.1	95.6	87.4	8424	96.2
2002	7918.1	1043	89.2	87.9	88.2	87.1	86.7	87.4	7875	89.9
2003	8002.5	1062	88.2	88.0	88.2	87.2	86.5	87.3	7742	88.4
2004	8813.9	1064	94.9	88.3	94.3	87.6	94.3	87.7	8457	96.3
2005	6765.1	1064	75.9	87.7	72.8	86.8	72.6	86.9	6768	77.3
2006	8872.5	1064	95.6	88.1	95.3	87.2	95.2	87.3	8492	96.9
2007	6008.4	1064	66.1	87.0	64.5	86.2	64.5	86.2	5898	67.3
2008	7856.3	1064	84.4	86.9	84.1	86.1	84.1	86.1	7643	87.0
2009	7747.0	1064	85.5	86.9	83.1	85.9	83.1	86.0	7618	87.0
2010	9201.9	1064	99.0	87.4	98.7	86.5	98.7	86.5	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					219	
B. Refuelling without a maintenance				8	4	
C. Inspection, maintenance or repair combined with refuelling				616	2	
D. Inspection, maintenance or repair without refuelling				48		
E. Testing of plant systems or components				20		
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	0
L. Human factor related					3	
P. Fire					22	
Z. Others					6	
Subtotal	0	0	0	692	262	3
Total		0			957	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		45
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		4
15. Reactor Cooling Systems		8
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities		23
31. Turbine and auxiliaries		74
32. Feedwater and Main Steam System		5
41. Main Generator Systems		29
42. Electrical Power Supply Systems		7
Total	0	214

ES-2 SANTA MARIA DE GARONA

Operator: NUCLENOR (NUCLENOR, S.A.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 446.0 MW(e)
 Design Net Capacity: 440.0 MW(e)
 Design Discharge Burnup: 31000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3662.6 GW(e).h
 Energy Availability Factor: 93.7%
 Load Factor: 93.7%
 Operating Factor: 95.2%
 Energy Unavailability Factor: 6.3%
 Total Off-line Time: 423 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	331.7	227.8	329.9	318.6	205.2	321.1	331.3	328.5	319.7	300.0	316.7	332.0	3662.6
EAF (%)	99.9	76.0	99.6	99.2	61.9	100.0	99.8	99.0	99.6	90.3	98.5	99.9	93.7
UCF (%)	99.9	76.0	99.6	99.2	61.9	100.0	100.0	99.4	100.0	90.3	98.5	99.9	93.8
LF (%)	100.0	76.0	99.6	99.2	61.9	100.0	99.8	99.0	99.6	90.3	98.6	100.1	93.7
OF (%)	100.0	83.3	100.0	100.0	64.5	100.0	100.0	100.0	100.0	93.7	100.0	100.0	95.2
EUf (%)	0.1	24.0	0.4	0.8	38.1	0.0	0.2	1.0	0.4	9.7	1.5	0.1	6.3
PUF (%)	0.1	0.0	0.1	0.1	38.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	3.3
UCLF (%)	0.0	24.0	0.4	0.7	0.1	0.0	0.0	0.0	0.0	9.7	1.5	0.1	2.9
XUF (%)	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.4	0.4	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

-OPERATION AT FULL POWER IN BASE LOAD MODE. -REFUELING OUTAGE FROM 2010-05-02 TO 2010-05-13.

5. Historical Summary

Date of Construction Start: 09 Jan 1966
 Date of First Criticality: 11 May 1970
 Date of Grid Connection: 03 Feb 1971
 Date of Commercial Operation: 05 Nov 1971
 Lifetime Generation: 119693.4 GW(e).h
 Cumulative Energy Availability Factor: 78.1%
 Cumulative Load Factor: 77.6%
 Cumulative Unit Capability Factor: 78.8%
 Cumulative Energy Unavailability Factor: 21.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	1380.3	456	51.0	51.0	51.0	51.0	51.0	51.0	4029	68.5
1972	2668.9	460	66.0	60.0	66.0	60.0	66.1	60.0	6683	76.1
1973	2351.7	440	72.5	64.6	72.5	64.6	61.0	60.4	6532	74.6
1974	2237.8	440	58.0	62.8	58.0	62.8	58.1	59.8	6456	73.7
1975	2746.8	440	71.3	64.6	71.3	64.6	71.3	62.2	7079	80.8
1976	2859.9	440	74.0	66.2	74.0	66.2	74.0	64.2	7039	80.1
1977	1815.1	440	47.1	63.4	47.1	63.4	47.1	61.7	4743	54.1
1978	3111.1	440	80.7	65.6	80.7	65.6	80.7	64.2	7409	84.6
1979	2339.4	440	60.6	65.1	60.6	65.1	60.7	63.8	5786	66.1
1980	780.8	440	19.5	60.4	19.5	60.4	20.2	59.3	1926	21.9
1981	3178.7	440	82.4	62.4	82.4	62.4	82.5	61.4	7597	86.7
1982	2044.1	440	53.3	61.6	53.3	61.6	53.0	60.7	5132	58.6
1983	2322.1	440	60.2	61.5	60.2	61.5	60.2	60.7	5630	64.3
1984	2873.5	440	85.6	63.3	74.2	62.5	74.3	61.7	6853	78.0
1985	1731.0	440	46.6	62.2	44.1	61.2	44.9	60.5	4285	48.9
1986	3413.6	440	91.8	64.0	88.6	63.0	88.6	62.3	8173	93.3
1987	2565.1	440	67.6	64.3	66.6	63.2	66.6	62.6	6205	70.8
1988	2693.3	440	70.0	64.6	70.0	63.6	69.7	63.0	6639	75.6
1989	3515.8	440	92.2	66.0	91.3	65.0	91.2	64.5	8324	95.0
1990	2558.6	440	66.4	66.1	66.4	65.1	66.4	64.6	6297	71.9
1991	3678.3	440	95.4	67.5	95.4	66.6	95.4	66.1	8528	97.4
1992	2377.3	440	69.7	67.6	69.2	66.7	61.5	65.9	6360	72.4
1993	3671.9	440	95.1	68.8	95.1	67.9	95.3	67.1	8444	96.4
1994	3134.1	440	82.0	69.3	81.2	68.5	81.3	67.7	7271	83.0
1995	3826.0	440	99.3	70.6	99.1	69.7	99.3	69.0	8760	100.0
1996	3203.8	440	83.2	71.0	82.5	70.2	82.9	69.6	7450	84.8
1997	3363.7	440	89.2	71.7	89.1	70.9	87.3	70.2	7853	89.7
1998	3792.5	446	98.0	72.7	97.5	71.9	97.1	71.2	8735	99.7
1999	3330.8	448	86.1	73.2	84.9	72.4	84.9	71.7	7639	87.2
2000	3854.6	446	98.8	74.0	98.4	73.2	98.4	72.6	8699	99.0
2001	3435.0	446	88.0	74.5	87.9	73.7	87.9	73.1	7737	88.3
2002	3841.4	446	98.8	75.3	98.3	74.5	98.3	73.9	8679	99.1
2003	3577.7	446	92.0	75.8	91.6	75.0	91.6	74.4	8085	92.3
2004	3873.8	446	98.8	76.5	98.7	75.7	98.9	75.2	8699	99.0
2005	3515.3	446	90.1	76.9	89.8	76.2	90.0	75.6	7946	90.7
2006	3666.8	446	95.8	77.4	93.7	76.7	93.9	76.1	8487	96.9
2007	3321.9	446	85.1	77.6	84.9	76.9	85.0	76.4	7889	90.1
2008	3841.3	446	98.4	78.2	98.2	77.4	98.1	76.9	8710	99.2
2009	3414.0	446	88.0	78.4	87.4	77.7	87.4	77.2	7855	89.7
2010	3662.6	446	93.8	78.8	93.7	78.1	93.7	77.6	8337	95.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		159			409	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	264			989	9	
D. Inspection, maintenance or repair without refuelling				42	1	
E. Testing of plant systems or components				2	4	
H. Nuclear regulatory requirements				19	33	16
J. Grid limitation, failure or grid unavailability					1	10
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				6	13	19
L. Human factor related		0			1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
Z. Others					3	
Subtotal	264	159	0	1058	485	48
Total		423			1591	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		27
12. Reactor I&C Systems		37
13. Reactor Auxiliary Systems	46	13
14. Safety Systems		32
15. Reactor Cooling Systems	112	173
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		23
35. All other I&C Systems		0
41. Main Generator Systems		5
42. Electrical Power Supply Systems		36
Total	158	366

ES-11 TRILLO-1

Operator: CNAT (CENTRALES NUCLEARES ALMARAZ-TRILLO(ID/UFG/ENDESA/HC/NUCLENOR))

Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP)
 at the beginning of 2010: 1003.0 MW(e)
 Design Net Capacity: 990.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7695.5 GW(e).h
 Energy Availability Factor: 87.8%
 Load Factor: 87.6%
 Operating Factor: 91.0%
 Energy Unavailability Factor: 12.2%
 Total Off-line Time: 791 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	691.6	626.5	638.7	323.5	355.1	713.5	726.7	732.5	709.6	735.3	707.3	735.3	7695.5
EAF (%)	92.6	92.9	85.7	44.8	48.4	99.2	97.9	98.8	98.7	98.6	98.0	98.7	87.8
UCF (%)	92.6	92.9	85.7	44.8	48.4	100.0	99.1	100.0	100.0	99.9	99.2	100.0	88.5
LF (%)	92.7	92.9	85.7	44.8	47.6	98.8	97.4	98.2	98.3	98.4	97.9	98.5	87.6
OF (%)	100.0	100.0	94.1	48.6	49.9	100.0	100.0	100.0	100.0	100.0	99.4	100.0	91.0
EUF (%)	7.4	7.1	14.3	55.2	51.6	0.8	2.1	1.2	1.3	1.4	2.0	1.3	12.2
PUF (%)	7.4	7.1	6.3	55.2	49.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	10.4
UCLF (%)	0.0	0.0	8.0	0.0	2.3	0.0	0.9	0.0	0.0	0.0	0.8	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.8	1.2	1.2	1.3	1.3	1.2	1.3	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

UNIT OPERATED AT 100% POWER, EXCEPT FOR PERIODS OF REPORTED OUTAGES

5. Historical Summary

Date of Construction Start: 17/08/1979 Lifetime Generation: 168828.0 GW(e).h
 Date of First Criticality: 14/05/1988 Cumulative Energy Availability Factor: 86.4%
 Date of Grid Connection: 23/05/1988 Cumulative Load Factor: 85.9%
 Date of Commercial Operation: 08 Jun 1988 Cumulative Unit Capability Factor: 86.6%
 Cumulative Energy Unavailability Factor: 13.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	2419.5	997	72.7	72.7	72.7	72.7	66.3	66.3	2648	72.1
1989	7147.8	974	83.8	80.5	83.8	80.4	83.8	78.5	7665	87.5
1990	6372.4	974	74.7	78.1	74.7	78.1	74.7	76.9	7170	81.8
1991	6481.5	974	76.0	77.5	76.0	77.5	76.0	76.7	6891	78.7
1992	7938.5	1000	90.4	80.4	90.4	80.4	90.4	79.8	8028	91.4
1993	7395.9	1000	84.4	81.2	84.4	81.2	84.4	80.7	7512	85.8
1994	7927.7	1000	91.0	82.7	91.0	82.7	90.5	82.2	8009	91.4
1995	7472.6	1000	86.4	83.2	85.8	83.1	85.3	82.7	7597	86.7
1996	7626.3	1000	87.4	83.7	87.3	83.7	86.8	83.2	7713	87.8
1997	7765.5	1000	91.9	84.6	89.3	84.3	88.6	83.7	8066	92.1
1998	6589.7	1000	76.1	83.8	75.8	83.4	75.2	82.9	6686	76.3
1999	6828.8	1000	78.0	83.3	78.0	83.0	77.9	82.5	6876	78.5
2000	8206.5	1000	93.7	84.1	93.6	83.8	93.4	83.4	8251	93.9
2001	7907.4	1000	90.7	84.6	90.6	84.3	90.3	83.9	7966	90.9
2002	7827.0	1000	89.6	85.0	89.6	84.7	89.3	84.3	7876	89.9
2003	8114.7	1003	93.1	85.5	93.1	85.2	92.5	84.8	8210	93.7
2004	7980.1	1003	91.5	85.9	91.5	85.6	90.6	85.2	8121	92.4
2005	8080.6	1003	92.9	86.3	92.9	86.1	92.0	85.5	8175	93.3
2006	7687.8	1003	88.6	86.4	88.4	86.2	87.5	85.7	7788	88.9
2007	7948.9	1003	91.5	86.7	91.4	86.5	90.5	85.9	8039	91.8
2008	7744.0	1003	88.7	86.8	88.5	86.6	87.9	86.0	7820	89.0
2009	7197.1	1003	82.5	86.6	82.4	86.4	81.9	85.8	7438	84.9
2010	7695.5	1003	88.5	86.6	87.8	86.4	87.6	85.9	7969	91.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		65		3	120	
C. Inspection, maintenance or repair combined with refuelling	725			785		
D. Inspection, maintenance or repair without refuelling				0	21	
Subtotal	725	65	0	788	141	0
Total		790			929	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		5
15. Reactor Cooling Systems		36
16. Steam generation systems		13
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		30
32. Feedwater and Main Steam System	44	2
41. Main Generator Systems	21	11
42. Electrical Power Supply Systems		11
XX. Miscellaneous Systems		3
Total	65	120

ES-16 VANDELLOS-2**Operator:** ANAV (ASOCIACION NUCLEAR ASCO-VANDELLOS A.I.E. (ENDESA/ID))**Contractor:** WH (WESTINGHOUSE ELECTRIC CORPORATION)**1. Station Details**

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1045.0 MW(e)
Design Net Capacity: 930.0 MW(e)
Design Discharge Burnup: 50500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8498.8 GW(e).h
Energy Availability Factor: 92.8%
Load Factor: 92.8%
Operating Factor: 94.7%
Energy Unavailability Factor: 7.2%
Total Off-line Time: 467 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	774.1	699.7	273.0	725.2	770.3	740.8	756.1	752.0	730.4	762.0	744.0	771.1	8498.8
EAF (%)	99.6	99.6	34.5	96.4	99.1	98.5	97.3	96.7	97.1	97.9	98.9	99.2	92.8
UCF (%)	99.8	99.8	35.1	97.0	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	94.1
LF (%)	99.6	99.6	35.2	96.4	99.1	98.5	97.3	96.7	97.1	97.9	98.9	99.2	92.8
OF (%)	100.0	100.0	37.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7
EUf (%)	0.4	0.4	65.5	3.6	0.9	1.5	2.7	3.3	2.9	2.1	1.1	0.8	7.2
PUf (%)	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
UCLF (%)	0.0	0.0	64.8	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7
XUF (%)	0.2	0.1	0.6	0.6	0.7	1.4	2.6	3.1	2.7	2.0	0.9	0.6	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 29/12/1980 **Lifetime Generation:** 163328.7 GW(e).h
Date of First Criticality: 14/11/1987 **Cumulative Energy Availability Factor:** 81.6%
Date of Grid Connection: 12 Dec 1987 **Cumulative Load Factor:** 81.6%
Date of Commercial Operation: 03 Aug 1988 **Cumulative Unit Capability Factor:** 82.4%
Cumulative Energy Unavailability Factor: 18.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	4610.9	930	68.3	68.3	67.4	67.4	67.5	67.5	5180	70.5
1989	5868.8	943	70.6	69.6	70.6	69.1	71.0	69.4	6357	72.6
1990	7334.3	943	87.8	76.0	87.8	75.7	88.8	76.3	7925	90.5
1991	7214.9	953	88.5	79.3	86.3	78.5	86.4	79.0	7825	89.3
1992	6718.2	953	79.6	79.4	79.6	78.7	80.3	79.2	7249	82.5
1993	6910.4	961	84.3	80.2	82.4	79.4	82.1	79.7	7377	84.2
1994	7208.4	961	85.6	81.0	85.6	80.3	85.6	80.6	7676	87.6
1995	7571.3	961	89.5	82.1	89.5	81.5	89.9	81.8	7957	90.8
1996	7511.4	961	89.1	82.9	89.0	82.3	89.0	82.6	7942	90.4
1997	7243.1	961	88.7	83.5	85.5	82.7	86.0	83.0	7961	90.9
1998	8359.0	966	99.3	85.0	99.0	84.2	98.8	84.4	8760	100.0
1999	7224.4	1024	83.4	84.8	82.5	84.0	80.5	84.1	7430	84.8
2000	7976.9	1043	87.9	85.1	87.6	84.3	87.1	84.3	7852	89.4
2001	9010.3	1043	99.4	86.2	99.4	85.5	98.6	85.4	8727	99.6
2002	8010.1	1040	89.2	86.4	88.1	85.7	87.9	85.6	7881	90.0
2003	8219.3	1040	90.9	86.7	89.5	86.0	90.2	85.9	8067	92.1
2004	8677.0	1045	95.8	87.3	94.5	86.5	94.5	86.5	8429	96.0
2005	4698.4	1045	51.7	85.2	51.3	84.4	51.3	84.4	4657	53.2
2006	7022.7	1045	78.0	84.8	76.2	83.9	76.7	84.0	6882	78.6
2007	5387.8	1045	59.4	83.4	59.1	82.6	58.9	82.6	5313	60.7
2008	6926.0	1045	76.3	83.1	75.4	82.3	75.5	82.3	6922	78.8
2009	5164.1	1045	57.5	81.9	56.4	81.0	56.4	81.0	5241	59.8
2010	8498.8	1045	94.1	82.4	92.8	81.6	92.8	81.6	8293	94.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		491			443	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling				671	1	
D. Inspection, maintenance or repair without refuelling				55	2	
E. Testing of plant systems or components				4	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling					78	
J. Grid limitation, failure or grid unavailability					3	11
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						5
Subtotal	0	491	0	730	536	16
Total		491			1282	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		12
12. Reactor I&C Systems	491	52
13. Reactor Auxiliary Systems		137
15. Reactor Cooling Systems		29
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		8
33. Circulating Water System		4
41. Main Generator Systems		81
42. Electrical Power Supply Systems		95
XX. Miscellaneous Systems		4
Total	491	438

SE-9 FORSMARK-1

Operator: FKA (FORSMARK KRAFTGRUPP AB)
Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 978.0 MW(e)
Design Net Capacity: 900.0 MW(e)
Design Discharge Burnup: 42000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7993.6 GW(e).h
Energy Availability Factor: 92.8%
Load Factor: 93.3%
Operating Factor: 94.6%
Energy Unavailability Factor: 7.2%
Total Off-line Time: 477 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	731.5	663.9	730.9	710.4	726.3	692.4	686.0	195.4	684.7	728.9	708.5	734.7	7993.6
EAF (%)	99.6	100.0	99.5	100.0	99.7	98.3	94.3	27.0	97.1	99.9	100.0	100.0	92.8
UCF (%)	99.6	100.0	99.5	100.0	100.0	99.8	96.7	27.6	98.9	100.0	100.0	100.0	93.4
LF (%)	100.5	101.0	100.5	100.9	99.8	98.3	94.3	26.9	97.2	100.2	100.6	101.0	93.3
OF (%)	100.0	100.0	99.9	100.0	100.0	100.0	100.0	36.0	100.0	100.0	100.0	100.0	94.6
EUF (%)	0.4	0.0	0.5	0.0	0.3	1.7	5.7	73.0	2.9	0.1	0.0	0.0	7.2
PUF (%)	0.4	0.0	0.5	0.0	0.0	0.2	2.7	67.5	0.8	0.0	0.0	0.0	6.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.6	4.8	0.3	0.0	0.0	0.0	0.5
XUF (%)	0.0	0.0	0.0	0.0	0.3	1.4	2.4	0.6	1.8	0.1	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE YEAR 2010 TURN OUT TO BE ONE OF THE BEST PRODUCTION YEAR FOR A LONG TIME WITH A ENERGY AVAILABILITY FACTOR OF 87,9 PERCENT (LOAD FACTOR 90,1 %). DURING THE PLANT ANNUAL OUTAGE AND BESIDE REFUELLING 19 CHANGES, 14 COMPONENTS REPLACEMENTS AND 21 SYSTEM ADJUSTMENT WAS PASSED THROUGH.

5. Historical Summary

Date of Construction Start: 06 Jan 1973
Date of First Criticality: 23/04/1980
Date of Grid Connection: 06 Jun 1980
Date of Commercial Operation: 12 Oct 1980

Lifetime Generation: 205889.0 GW(e).h
Cumulative Energy Availability Factor: 83.6%
Cumulative Load Factor: 81.5%
Cumulative Unit Capability Factor: 86.1%
Cumulative Energy Unavailability Factor: 16.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	669.6	928	100.0	100.0	100.0	100.0	100.0	100.0	744	100.0
1981	6063.7	900	76.9	78.7	76.9	78.7	76.9	78.7	7305	83.4
1982	5548.1	900	70.4	74.7	70.4	74.7	70.4	74.7	7131	81.4
1983	5926.0	900	75.2	74.9	75.2	74.9	75.2	74.9	8095	92.4
1984	6461.8	900	91.9	79.0	91.9	79.0	81.7	76.5	8207	93.4
1985	5587.6	900	79.4	79.1	79.4	79.1	70.9	75.4	7773	88.7
1986	7317.2	954	89.8	81.0	89.8	81.0	87.5	77.5	8303	94.8
1987	6493.4	970	79.5	80.7	79.5	80.7	76.4	77.4	8291	94.6
1988	6852.8	970	81.8	80.9	81.8	80.9	80.4	77.8	7739	88.1
1989	6138.6	969	85.5	81.4	85.5	81.4	72.3	77.1	7907	90.3
1990	6257.5	972	85.8	81.9	85.8	81.9	73.5	76.8	7885	90.0
1991	7487.6	968	90.6	82.7	88.3	82.5	88.3	77.8	8122	92.7
1992	6833.6	968	85.2	82.9	80.3	82.3	80.4	78.0	8175	93.1
1993	7022.8	968	91.9	83.6	82.7	82.3	82.8	78.4	8010	91.4
1994	7398.2	968	91.4	84.2	87.0	82.7	87.2	79.1	8109	92.6
1995	7325.2	968	91.3	84.7	86.2	82.9	86.4	79.6	8173	93.3
1996	7311.4	968	95.3	85.3	86.4	83.1	86.0	80.0	8412	95.8
1997	5402.9	968	64.6	84.1	64.6	82.0	63.5	79.0	6255	71.2
1998	7307.7	968	93.6	84.6	93.6	82.7	86.2	79.4	8265	94.3
1999	7582.7	968	96.7	85.3	96.3	83.4	89.4	79.9	8420	96.1
2000	5730.8	968	85.9	85.3	67.4	82.6	67.4	79.3	7202	82.0
2001	7286.1	968	94.8	85.8	86.3	82.8	85.9	79.6	8482	96.8
2002	7143.8	961	90.0	86.0	86.0	82.9	84.9	79.8	7978	91.1
2003	7456.0	961	88.5	86.1	88.5	83.1	88.6	80.2	8093	92.4
2004	8032.3	961	97.5	86.5	95.6	83.7	95.2	80.9	8555	97.4
2005	7291.1	1011	85.4	86.5	84.4	83.7	85.1	81.0	7648	87.3
2006	6683.9	995	76.5	86.1	75.4	83.4	75.5	80.8	6806	77.7
2007	6961.4	987	81.1	85.9	80.4	83.3	80.5	80.8	7204	82.2
2008	6973.7	978	81.4	85.7	80.8	83.2	81.1	80.8	7442	84.7
2009	7555.4	978	88.4	85.8	87.9	83.3	88.2	81.1	8029	91.7
2010	7993.6	978	93.4	86.1	92.8	83.6	93.3	81.5	8283	94.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		36			154	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	440			596		
D. Inspection, maintenance or repair without refuelling				23		
E. Testing of plant systems or components				3		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				33		
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						14
L. Human factor related					34	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)					4	
Z. Others	1					
Subtotal	441	36	0	655	194	15
Total		477			864	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		17
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		5
14. Safety Systems		1
15. Reactor Cooling Systems		11
17. Safety I&C Systems (excluding reactor I&C)		3
21. Fuel Handling and Storage Facilities		27
31. Turbine and auxiliaries	36	10
32. Feedwater and Main Steam System		2
41. Main Generator Systems		4
42. Electrical Power Supply Systems		55
XX. Miscellaneous Systems		1
Total	36	148

SE-11 FORSMARK-2

Operator: FKA (FORSMARK KRAFTGRUPP AB)
 Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 990.0 MW(e)
 Design Net Capacity: 900.0 MW(e)
 Design Discharge Burnup: 42000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3334.2 GW(e).h
 Energy Availability Factor: 38.3%
 Load Factor: 38.4%
 Operating Factor: 87.2%
 Energy Unavailability Factor: 61.7%
 Total Off-line Time: 1125 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	422.7	186.9	103.2	181.0	238.7	228.3	236.5	211.8	104.8	52.3	687.3	680.7	3334.2
EAF (%)	56.7	27.5	14.0	25.3	32.4	32.0	32.1	29.3	14.7	7.1	95.8	91.6	38.3
UCF (%)	56.7	27.5	14.0	25.3	32.8	32.8	33.2	30.4	15.1	7.1	95.8	91.6	38.6
LF (%)	57.4	28.1	14.0	25.4	32.4	32.0	32.1	28.8	14.7	7.1	96.4	92.4	38.4
OF (%)	100.0	100.0	99.9	100.0	100.0	100.0	96.9	85.5	47.2	23.4	100.0	94.2	87.2
EUf (%)	43.3	72.5	86.0	74.7	67.6	68.0	67.9	70.7	85.3	92.9	4.2	8.4	61.7
PUF (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	14.5	54.9	82.5	4.2	0.0	13.1
UCLF (%)	43.3	72.5	85.8	74.7	67.2	67.2	66.8	55.0	30.0	10.4	0.0	8.4	48.3
XUF (%)	0.0	0.0	0.0	0.0	0.4	0.7	1.1	1.1	0.4	0.0	0.0	0.0	0.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE YEAR 2010 PRODUCTION YEAR WAS NOT SO GOOD AS PLANNED/EXPECTED DUE TO INTRODUCTION OF OCILLATION PROBLEMS ON CONTROL VALVES AT THE TURBINE SIDE WHEN THE VALVES WAS MODIFIED TO OPERATE IN A SUITABLE MANNER ALSO AFTER THE PLANT POWER UPGRADE WAS MADE. THE PLANNED ANNUAL OUTAGE BECAME EXTENDED WITH ABOUT FIVE DAYS MAINLY DUE TO A SMALL STEAM LEAKAGE WAS DISCOVERED DURING START-UP COMMING FROM A TEST PIPE CONNECTED TO MAIN STEAM ISOLATION VALVE . DURING THE OPERATING PERIOD ALSO A NUMBER OF CONTROLS AND TESTS HAVE BEEN PERFORMED FOR REPLACEMENT OF CONTROL VALVES INCLUDING STOP OF TURBINES. THE VALVES WAS FINALLY REPLACED IN OCTOBER DURING A ADITIONAL OUTAGE PERIOD.

5. Historical Summary

Date of Construction Start: 01 Jan 1975 Lifetime Generation: 194732.0 GW(e).h
 Date of First Criticality: 16/11/1980 Cumulative Energy Availability Factor: 81.3%
 Date of Grid Connection: 26/01/1981 Cumulative Load Factor: 78.7%
 Date of Commercial Operation: 07 Jul 1981 Cumulative Unit Capability Factor: 83.5%
 Cumulative Energy Unavailability Factor: 18.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	2870.7	900	72.2	72.2	72.2	72.2	72.2	72.2	3977	90.1
1982	5316.4	900	67.4	69.0	67.4	69.0	67.4	69.0	6076	69.4
1983	5484.4	900	69.6	69.2	69.6	69.2	69.6	69.2	7879	89.9
1984	5911.7	900	82.6	73.1	82.6	73.0	74.8	70.8	7442	84.7
1985	5735.4	900	83.8	75.4	83.8	75.4	72.7	71.3	8048	91.9
1986	6987.9	938	86.5	77.5	86.5	77.5	85.0	73.8	8231	94.0
1987	6553.8	949	85.5	78.8	85.5	78.8	78.8	74.6	8190	93.5
1988	6976.2	963	83.2	79.4	83.2	79.4	82.5	75.7	8032	91.4
1989	5943.4	964	90.0	80.7	90.0	80.7	70.4	75.1	8222	93.9
1990	6426.2	972	88.6	81.6	88.6	81.6	75.5	75.1	8119	92.7
1991	7155.2	969	85.8	82.0	84.2	81.8	84.3	76.0	8084	92.3
1992	6748.9	969	86.2	82.4	79.2	81.6	79.3	76.3	8294	94.4
1993	6715.5	969	88.8	82.9	79.1	81.4	79.1	76.5	7684	87.7
1994	7679.5	969	92.5	83.6	90.4	82.1	90.5	77.6	8194	93.5
1995	7149.2	969	91.6	84.2	84.1	82.2	84.2	78.1	8144	93.0
1996	7348.2	969	91.2	84.7	86.2	82.5	86.3	78.6	8135	92.6
1997	7325.3	969	87.4	84.8	87.4	82.8	86.1	79.1	7927	90.2
1998	7198.6	969	92.1	85.3	91.9	83.3	84.8	79.4	8240	94.1
1999	7292.3	964	91.7	85.6	91.7	83.8	86.0	79.8	8117	92.7
2000	5428.1	964	79.6	85.3	66.3	82.9	64.1	79.0	6939	79.0
2001	7399.6	964	92.3	85.7	88.8	83.2	87.6	79.4	8321	95.0
2002	6823.9	959	89.9	85.9	82.2	83.1	81.0	79.5	8155	93.1
2003	7303.9	954	87.1	85.9	87.1	83.3	87.0	79.8	7916	90.4
2004	7982.2	954	96.9	86.4	95.2	83.8	95.3	80.5	8529	97.1
2005	7790.1	951	94.6	86.7	93.7	84.2	93.5	81.0	8348	95.3
2006	6011.9	951	73.1	86.2	72.5	83.8	72.2	80.7	6426	73.4
2007	7470.1	1000	85.7	86.2	85.0	83.8	85.3	80.8	7750	88.5
2008	6920.1	990	79.7	85.9	79.2	83.6	79.4	80.8	7342	83.6
2009	5530.7	990	64.1	85.1	63.6	82.9	63.8	80.2	5902	67.4
2010	3334.2	990	38.6	83.5	38.3	81.3	38.4	78.7	7635	87.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		43			230	
B. Refuelling without a maintenance				6	2	
C. Inspection, maintenance or repair combined with refuelling	488			507		
D. Inspection, maintenance or repair without refuelling	570			75		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				46		
H. Nuclear regulatory requirements					26	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						16
L. Human factor related		23			15	
P. Fire					4	
Z. Others	1					
Subtotal	1059	66	0	634	277	16
Total		1125			927	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		5
14. Safety Systems		15
15. Reactor Cooling Systems		11
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		69
31. Turbine and auxiliaries		69
32. Feedwater and Main Steam System		7
42. Electrical Power Supply Systems	43	29
Total	43	207

SE-14 FORSMARK-3

Operator: FKA (FORSMARK KRAFTGRUPP AB)
Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1170.0 MW(e)
Design Net Capacity: 1050.0 MW(e)
Design Discharge Burnup: 42000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8320.2 GW(e).h
Energy Availability Factor: 80.6%
Load Factor: 81.2%
Operating Factor: 83.5%
Energy Unavailability Factor: 19.4%
Total Off-line Time: 1443 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	881.9	796.7	880.5	703.1	782.4	776.0	676.8	836.9	309.9	0.0	794.2	881.8	8320.2
EAF (%)	100.0	100.0	100.0	82.5	89.9	92.1	77.8	96.1	36.7	0.0	93.5	100.0	80.6
UCF (%)	100.0	100.0	100.0	82.5	90.1	93.9	80.5	100.0	37.9	0.0	93.5	100.0	81.4
LF (%)	101.3	101.3	101.1	83.5	89.9	92.1	77.8	96.1	36.8	0.0	94.3	101.3	81.2
OF (%)	100.0	100.0	100.0	90.0	100.0	96.7	82.3	100.0	37.9	0.0	96.7	100.0	83.5
EUF (%)	0.0	0.0	0.0	17.5	10.1	7.9	22.2	3.9	63.3	100.0	6.5	0.0	19.4
PUF (%)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	62.1	100.0	6.4	0.0	14.1
UCLF (%)	0.0	0.0	0.0	17.4	9.9	6.1	19.5	0.0	0.0	0.0	0.1	0.0	4.4
XUF (%)	0.0	0.0	0.0	0.0	0.2	1.8	2.8	3.9	1.2	0.0	0.0	0.0	0.8

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THE YEAR 2010 TURN OUT TO BE A FAIRLY GOOD PRODUCTION YEAR WITH A ENERGY AVAILABILITY FACTOR OF 90,2 PERCENT (LOAD FACTOR 91,6 %). DURING THE PLANT ANNUAL OUTAGE AND BESIDE REFUELLING 121 CONTROL RODS SHAFTS WAS TAKEN OUT FOR CONTROL AND FOLLOW-UP AFTER PREVIOUS CRACK PROBLEMS AND NO CRACKS WAS FOUND.DURING THE OUTAGE 11 CHANGES, 6 COMPONENTS REPLACEMENTS AND 11 SYSTEM ADJUSTMENT WAS PASSED THROUGH. THE OUTAGE BECAME EXTENDED FROM 19 OCTOBER TO 2 NOV.

5. Historical Summary

Date of Construction Start: 01 Jan 1979 **Lifetime Generation:** 217034.0 GW(e).h
Date of First Criticality: 28/10/1984 **Cumulative Energy Availability Factor:** 86.2%
Date of Grid Connection: 03 May 1985 **Cumulative Load Factor:** 84.4%
Date of Commercial Operation: 18/08/1985 **Cumulative Unit Capability Factor:** 88.8%
Cumulative Energy Unavailability Factor: 13.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	3296.6	1068	93.8	93.8	93.8	93.8	85.5	85.5	3509	95.5
1986	8069.6	1060	88.4	90.0	88.4	90.0	86.9	86.5	7983	91.1
1987	7038.9	1063	77.9	84.9	77.9	84.9	75.6	82.0	7866	89.8
1988	7462.9	1068	80.4	83.6	80.4	83.6	79.6	81.3	7807	88.9
1989	7367.2	1118	85.8	84.1	85.8	84.1	75.2	79.8	7792	88.9
1990	7942.1	1150	91.3	85.5	80.1	83.3	78.8	79.6	8165	93.2
1991	8665.1	1155	87.5	85.8	85.6	83.7	85.6	80.6	8325	95.0
1992	8176.2	1197	89.5	86.4	81.2	83.3	77.8	80.2	7963	90.7
1993	8457.9	1158	93.2	87.2	83.4	83.3	83.4	80.6	8251	94.2
1994	9228.8	1158	93.4	87.9	90.9	84.2	91.0	81.7	8277	94.5
1995	8930.9	1158	92.8	88.4	88.2	84.6	88.0	82.3	8250	94.2
1996	8819.2	1158	89.1	88.4	86.7	84.8	86.7	82.7	8008	91.2
1997	8955.2	1158	89.9	88.6	89.9	85.2	88.0	83.2	8004	91.1
1998	8960.7	1158	93.9	89.0	93.8	85.8	88.3	83.6	8227	93.9
1999	8825.5	1155	91.1	89.1	91.0	86.2	87.1	83.8	8005	91.4
2000	7933.9	1157	94.9	89.5	87.7	86.3	78.1	83.4	8038	91.5
2001	8182.4	1155	86.2	89.3	81.8	86.0	80.9	83.3	7585	86.6
2002	9079.4	1158	95.0	89.6	91.2	86.3	89.5	83.6	8450	96.5
2003	9100.3	1155	89.9	89.6	89.9	86.5	89.9	84.0	8507	97.1
2004	8973.5	1185	89.4	89.6	87.7	86.6	87.7	84.2	7920	90.2
2005	9868.8	1190	96.2	90.0	94.6	87.0	94.7	84.7	8491	96.9
2006	9600.5	1170	94.6	90.2	92.4	87.3	92.2	85.1	8323	95.0
2007	8992.6	1170	88.2	90.1	87.3	87.3	87.7	85.2	7770	88.7
2008	7109.8	1170	69.7	89.2	68.8	86.4	69.2	84.5	6185	70.4
2009	8815.5	1170	86.0	89.1	85.5	86.4	86.0	84.6	7624	87.0
2010	8320.2	1170	81.4	88.8	80.6	86.2	81.2	84.4	7317	83.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		156			121	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1215			549		
D. Inspection, maintenance or repair without refuelling				11		
E. Testing of plant systems or components				2		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				10		
H. Nuclear regulatory requirements					11	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						8
L. Human factor related					0	
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		72				
Subtotal	1215	228	0	572	133	8
Total		1443			713	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	156	6
12. Reactor I&C Systems		70
13. Reactor Auxiliary Systems		4
15. Reactor Cooling Systems		9
17. Safety I&C Systems (excluding reactor I&C)		5
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		8
41. Main Generator Systems		0
42. Electrical Power Supply Systems		10
Total	156	116

SE-2 OSKARSHAMN-1

Operator: OKG (OKG AKTIEBOLAG)

Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 473.0 MW(e)
 Design Net Capacity: 440.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3185.4 GW(e).h
 Energy Availability Factor: 78.1%
 Load Factor: 76.9%
 Operating Factor: 80.4%
 Energy Unavailability Factor: 21.9%
 Total Off-line Time: 1721 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	347.4	312.9	342.2	326.4	344.4	192.8	328.2	112.7	14.8	186.4	330.2	346.8	3185.4
EAF (%)	99.1	99.1	98.4	95.9	98.2	56.6	93.6	37.5	4.4	55.4	99.3	99.4	78.1
UCF (%)	99.1	99.1	98.4	96.3	99.3	58.1	96.4	38.7	4.4	55.8	99.7	99.5	78.7
LF (%)	98.7	98.4	97.4	95.8	97.9	56.6	93.3	32.0	4.4	52.9	97.0	98.5	76.9
OF (%)	100.0	100.0	100.0	100.0	100.0	64.3	100.0	37.4	6.1	56.8	100.0	100.0	80.4
EUf (%)	0.9	0.9	1.6	4.1	1.8	43.4	6.4	62.5	95.6	44.6	0.7	0.6	21.9
PUF (%)	0.1	0.2	0.0	0.2	0.2	0.0	0.0	53.6	70.5	0.1	0.0	0.1	10.4
UCLF (%)	0.8	0.7	1.6	3.5	0.5	41.9	3.6	7.7	25.1	44.2	0.3	0.5	10.9
XUF (%)	0.0	0.0	0.0	0.3	1.1	1.5	2.7	1.3	0.0	0.4	0.3	0.0	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 08 Jan 1966 Lifetime Generation: 96109.6 GW(e).h
 Date of First Criticality: 12 Dec 1970 Cumulative Energy Availability Factor: 63.9%
 Date of Grid Connection: 19/08/1971 Cumulative Load Factor: 62.7%
 Date of Commercial Operation: 02 Jun 1972 Cumulative Unit Capability Factor: 64.2%
 Cumulative Energy Unavailability Factor: 36.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	1253.4	440	35.2	35.2	35.2	35.2	35.4	35.4	3318	41.3
1973	1967.9	440	49.9	42.9	49.9	42.9	51.1	43.6	4871	55.6
1974	1283.9	440	33.4	39.6	33.4	39.6	33.3	40.1	3067	35.0
1975	2435.3	440	69.5	47.3	69.5	47.3	63.2	46.0	6483	74.0
1976	2469.5	440	62.1	50.3	62.1	50.3	63.9	49.6	6278	71.5
1977	2677.1	440	69.5	53.5	69.5	53.5	69.5	53.0	6540	74.7
1978	3113.8	440	80.3	57.4	80.3	57.4	80.8	57.0	7390	84.4
1979	2716.4	440	70.0	59.0	70.0	59.0	70.5	58.7	6422	73.3
1980	2994.0	440	77.4	61.0	77.4	61.0	77.5	60.8	7221	82.2
1981	2885.7	440	75.1	62.5	75.1	62.5	74.9	62.2	7094	81.0
1982	2937.7	440	76.2	63.7	76.2	63.7	76.2	63.5	6966	79.5
1983	3133.4	440	81.8	65.2	81.8	65.2	81.3	65.0	7693	87.8
1984	2959.9	440	82.2	66.6	82.2	66.6	76.6	65.9	7249	82.5
1985	2753.2	440	73.4	67.0	71.8	66.9	71.4	66.3	6490	74.1
1986	3134.4	440	83.0	68.1	83.0	68.0	81.3	67.3	7350	83.9
1987	3232.5	440	88.6	69.4	88.6	69.3	83.9	68.3	7808	89.1
1988	2863.3	442	74.6	69.7	74.5	69.6	73.8	68.7	6827	77.7
1989	3175.6	442	87.6	70.7	86.9	70.6	82.0	69.4	7787	88.9
1990	2493.8	442	64.9	70.4	64.6	70.3	64.4	69.1	5793	66.1
1991	3349.2	442	89.3	71.4	88.9	71.2	86.5	70.0	7855	89.7
1992	1784.8	442	49.7	70.3	49.4	70.2	46.0	68.9	4339	49.4
1993	0.0	445	0.0	67.1	0.0	66.9	0.0	65.7	0	0.0
1994	0.0	445	0.0	64.1	0.0	64.0	0.0	62.8	0	0.0
1995	0.0	445	0.0	61.4	0.0	61.3	0.0	60.2	0	0.0
1996	2380.0	445	61.6	61.4	60.9	61.3	60.9	60.2	5654	64.4
1997	2925.9	445	75.9	62.0	74.6	61.8	75.1	60.8	6716	76.7
1998	1297.7	445	32.6	60.9	32.6	60.7	33.3	59.7	2968	33.9
1999	3298.9	445	86.7	61.8	86.7	61.6	84.6	60.6	7647	87.3
2000	3060.2	445	88.8	62.8	88.1	62.6	78.3	61.2	7765	88.4
2001	3080.9	445	83.7	63.5	83.1	63.2	79.0	61.8	7449	85.0
2002	0.0	445	0.0	61.4	0.0	61.2	0.0	59.8	0	0.0
2003	3058.4	467	75.7	61.9	75.3	61.6	74.5	60.3	7075	80.8
2004	3536.5	467	87.6	62.7	87.4	62.5	86.2	61.1	7743	88.1
2005	3265.9	467	79.8	63.2	79.4	63.0	79.8	61.7	7129	81.4
2006	2088.4	467	51.3	62.9	50.9	62.6	51.0	61.4	4520	51.6
2007	2575.1	467	64.1	62.9	63.2	62.6	62.9	61.4	5703	65.1
2008	3496.4	473	88.4	63.6	85.5	63.3	84.7	62.1	7583	86.3
2009	2831.6	473	70.8	63.8	69.7	63.5	68.3	62.3	6657	76.0
2010	3185.4	473	78.7	64.2	78.1	63.9	76.9	62.7	7039	80.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		784		2	697	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	902			782	64	
D. Inspection, maintenance or repair without refuelling				648		
E. Testing of plant systems or components				2	3	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				214	8	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				11		
H. Nuclear regulatory requirements					291	
J. Grid limitation, failure or grid unavailability			36			1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					105	
L. Human factor related					7	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
U. Security and access control and other preventive shutdown due to external threads						1
Z. Others					9	
Subtotal	902	784	36	1659	1187	5
Total		1722			2851	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1971 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	123	122
12. Reactor I&C Systems		91
13. Reactor Auxiliary Systems		13
14. Safety Systems	26	27
15. Reactor Cooling Systems		26
21. Fuel Handling and Storage Facilities		18
31. Turbine and auxiliaries	501	274
32. Feedwater and Main Steam System		26
33. Circulating Water System		0
35. All other I&C Systems		4
41. Main Generator Systems	11	68
42. Electrical Power Supply Systems	122	22
XX. Miscellaneous Systems		1
Total	783	692

SE-3 OSKARSHAMN-2

Operator: OKG (OKG AKTIEBOLAG)

Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 638.0 MW(e)
Design Net Capacity: 580.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5032.9 GW(e).h
Energy Availability Factor: 91.3%
Load Factor: 90.1%
Operating Factor: 94.3%
Energy Unavailability Factor: 8.7%
Total Off-line Time: 495 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	464.3	417.4	459.4	449.0	458.5	438.8	453.2	447.0	429.4	313.1	243.3	459.8	5032.9
EAF (%)	98.6	98.6	98.4	98.2	97.3	95.9	96.3	95.0	96.0	68.2	54.6	98.3	91.3
UCF (%)	98.7	98.6	98.4	98.5	98.2	98.0	98.8	98.4	98.2	72.6	54.8	98.3	92.6
LF (%)	97.8	97.3	96.9	97.7	96.6	95.5	95.5	94.2	93.5	65.9	53.0	96.9	90.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	74.1	58.1	100.0	94.3
EUF (%)	1.4	1.4	1.6	1.8	2.7	4.1	3.7	5.0	4.0	31.8	45.4	1.7	8.7
PUF (%)	0.0	0.0	0.6	0.3	0.0	0.5	0.0	0.0	0.0	27.2	38.9	0.0	5.6
UCLF (%)	1.3	1.4	1.0	1.2	1.8	1.5	1.2	1.6	1.8	0.2	6.3	1.7	1.7
XUF (%)	0.0	0.0	0.0	0.3	0.9	2.1	2.5	3.4	2.2	4.3	0.2	0.0	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

IN 2010 ACHIEVED RECORD FOR ANNUAL ENERGY PRODUCTION. PRODUCTION NET 5033 GWH

5. Historical Summary

Date of Construction Start: 09 Jan 1969
Date of First Criticality: 03 Jun 1974
Date of Grid Connection: 10 Feb 1974
Date of Commercial Operation: 01 Jan 1975

Lifetime Generation: 144082.0 GW(e).h
Cumulative Energy Availability Factor: 80.3%
Cumulative Load Factor: 76.7%
Cumulative Unit Capability Factor: 81.2%
Cumulative Energy Unavailability Factor: 19.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	3010.9	565	60.9	60.9	60.9	60.9	60.8	60.8	5694	65.0
1976	2892.9	565	59.1	60.0	59.1	60.0	58.3	59.6	5744	65.4
1977	3360.7	565	69.0	63.0	69.0	63.0	67.9	62.3	6372	72.7
1978	3638.3	565	74.4	65.8	74.4	65.8	73.5	65.1	6695	76.4
1979	3789.4	565	80.3	68.7	80.3	68.7	76.6	67.4	7473	85.3
1980	4172.3	565	87.4	71.8	87.4	71.8	84.1	70.2	7699	87.6
1981	3836.1	565	81.0	73.2	81.0	73.2	77.5	71.2	7433	84.9
1982	4248.9	565	89.0	75.1	89.0	75.1	85.8	73.1	7904	90.2
1983	4054.5	590	86.2	76.4	86.2	76.4	78.7	73.7	7703	87.9
1984	4666.1	590	92.8	78.1	92.8	78.1	90.0	75.4	8252	93.9
1985	3932.3	590	87.2	79.0	87.2	79.0	76.1	75.5	7739	88.3
1986	4277.8	590	87.9	79.7	87.9	79.7	82.8	76.1	7770	88.7
1987	4230.8	590	87.7	80.4	87.4	80.3	81.9	76.6	7789	88.9
1988	4417.4	605	88.0	80.9	86.9	80.8	83.6	77.1	7894	89.9
1989	3960.7	605	88.4	81.4	86.3	81.2	74.7	76.9	8065	92.1
1990	4050.3	605	88.6	81.9	86.5	81.6	76.4	76.9	7885	90.0
1991	4103.4	605	83.9	82.0	82.0	81.6	77.4	76.9	7467	85.2
1992	2851.5	605	60.3	80.8	59.1	80.3	53.7	75.6	5310	60.5
1993	2611.5	605	55.0	79.4	53.7	78.8	49.3	74.1	4964	56.7
1994	4460.6	605	88.8	79.9	86.9	79.3	84.2	74.7	7884	90.0
1995	4175.8	605	83.7	80.0	82.3	79.4	78.8	74.9	7449	85.0
1996	3760.4	605	73.1	79.7	71.7	79.0	70.8	74.7	6543	74.5
1997	4417.4	605	86.4	80.0	85.4	79.3	83.4	75.1	7707	88.0
1998	4457.8	605	90.3	80.5	90.3	79.8	84.1	75.4	7951	90.8
1999	3198.2	605	63.3	79.8	62.5	79.1	60.3	74.8	5667	64.7
2000	3898.5	605	85.2	80.0	83.5	79.3	73.4	74.8	7525	85.7
2001	4748.5	602	92.3	80.4	90.8	79.7	90.0	75.3	8147	93.0
2002	4508.6	602	91.2	80.8	90.6	80.1	85.5	75.7	8043	91.8
2003	3055.3	602	59.8	80.1	59.2	79.4	57.9	75.1	5289	60.4
2004	4625.9	602	89.1	80.4	87.7	79.6	87.5	75.5	7900	89.9
2005	4728.1	602	92.3	80.8	90.0	80.0	89.7	76.0	8187	93.5
2006	4125.3	602	79.7	80.7	78.4	79.9	78.2	76.0	7089	80.9
2007	3993.2	602	77.8	80.7	76.4	79.8	76.1	76.0	6922	79.0
2008	4504.2	590	88.7	80.9	86.6	80.0	86.3	76.4	7871	89.6
2009	3950.0	624	78.1	80.8	76.5	79.9	75.3	76.3	7141	81.5
2010	5032.9	638	92.6	81.2	91.3	80.3	90.1	76.7	8265	94.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		37			215	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	455			888	95	
D. Inspection, maintenance or repair without refuelling				42		
E. Testing of plant systems or components				0	2	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				15	3	
H. Nuclear regulatory requirements					124	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					79	2
L. Human factor related					1	
P. Fire					1	
Z. Others					3	
Subtotal	455	37	0	945	525	3
Total		492			1473	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		25
12. Reactor I&C Systems		11
13. Reactor Auxiliary Systems		0
14. Safety Systems		6
15. Reactor Cooling Systems		21
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries	37	102
32. Feedwater and Main Steam System		18
33. Circulating Water System		1
35. All other I&C Systems		0
41. Main Generator Systems		5
42. Electrical Power Supply Systems		1
XX. Miscellaneous Systems		0
Total	37	191

SE-12 OSKARSHAMN-3

Operator: OKG (OKG AKTIEBOLAG)
Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1400.0 MW(e)
Design Net Capacity: 1050.0 MW(e)
Design Discharge Burnup: 32000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3841.8 GW(e).h
Energy Availability Factor: 31.6%
Load Factor: 31.3%
Operating Factor: 54.6%
Energy Unavailability Factor: 68.4%
Total Off-line Time: 3977 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	342.5	178.2	196.9	541.6	494.0	724.2	488.5	630.4	2.7	0.0	0.0	242.8	3841.8
EAF (%)	33.4	19.0	19.0	54.3	47.7	72.2	47.3	61.1	0.3	0.0	0.0	23.4	31.6
UCF (%)	33.4	19.0	19.1	54.5	48.1	73.4	48.1	63.0	0.3	0.0	0.0	23.4	32.0
LF (%)	32.9	18.9	18.9	53.7	47.4	71.9	46.9	60.5	0.3	0.0	0.0	23.3	31.3
OF (%)	100.0	42.3	38.9	99.4	71.0	97.5	74.5	90.6	1.0	0.0	0.0	38.3	54.6
EUF (%)	66.6	81.0	81.0	45.7	52.3	27.8	52.7	38.9	99.7	100.0	100.0	76.6	68.4
PUF (%)	66.6	0.0	0.0	0.0	29.4	16.9	0.0	0.0	0.0	71.0	26.7	0.0	17.8
UCLF (%)	0.0	81.0	80.9	45.5	22.5	9.6	51.9	37.0	99.7	29.0	73.3	76.6	50.3
XUF (%)	0.0	0.0	0.0	0.2	0.4	1.2	0.8	1.9	0.0	0.0	0.0	0.0	0.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING THE YEAR THE TEST PROGRAM CONTINUED AFTER THE INSTALLATION OF THE PROJECT PULS (POWER UPRATE WITH LICENSED SAFETY)2009. PROBLEMS DURING THE YEAR HAVE INCLUDED REPEAT TURBINE PROBLEMS CAUSED BY BEARINGS VIBRATION (UNPLANNED PRODUCTIONS LOSS)TO MOVE THE ORIGINAL PLANNED OUTAGE FROM MAY TO AUTUMN THERE WAS A SHORT REFUELLING IN MAY AND THE MAIN REFUELLING WAS IN OCTOBER.

5. Historical Summary

Date of Construction Start: 05 Jan 1980 **Lifetime Generation:** 200630.2 GW(e).h
Date of First Criticality: 29/12/1984 **Cumulative Energy Availability Factor:** 82.5%
Date of Grid Connection: 03 Mar 1985 **Cumulative Load Factor:** 78.4%
Date of Commercial Operation: 15/08/1985 **Cumulative Unit Capability Factor:** 83.2%
Cumulative Energy Unavailability Factor: 17.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	3070.3	1055	93.0	93.0	93.0	93.0	79.3	79.3	3429	93.4
1986	8386.9	1060	91.9	92.2	91.9	92.2	90.4	87.1	8111	92.6
1987	7058.0	1065	89.6	91.2	89.4	91.1	75.7	82.4	7988	91.2
1988	7311.9	1060	83.9	89.0	83.6	88.9	78.4	81.2	7457	84.9
1989	7788.2	1035	93.1	89.9	92.8	89.7	84.4	81.9	8241	94.1
1990	7640.2	1060	84.1	88.9	83.2	88.6	83.2	82.1	7781	88.8
1991	8935.8	1160	91.6	89.3	90.9	89.0	87.9	83.1	8183	93.4
1992	8270.6	1160	90.1	89.4	89.5	89.0	81.2	82.8	7903	90.0
1993	8339.5	1160	91.7	89.7	90.9	89.3	82.1	82.7	8026	91.6
1994	8480.4	1160	89.1	89.7	88.4	89.2	83.5	82.8	7878	89.9
1995	8828.1	1160	89.8	89.7	87.5	89.0	86.9	83.2	7957	90.8
1996	8518.4	1153	85.1	89.3	84.6	88.6	84.1	83.3	7543	85.9
1997	8970.4	1155	91.0	89.4	89.8	88.7	88.6	83.8	8042	91.8
1998	8032.3	1155	89.3	89.4	88.7	88.7	79.4	83.4	7914	90.3
1999	8516.7	1155	89.7	89.4	88.9	88.7	84.2	83.5	7850	89.6
2000	7219.1	1155	91.2	89.5	91.2	88.9	71.2	82.6	8075	91.9
2001	9052.0	1155	92.6	89.7	91.8	89.1	89.5	83.1	8170	93.3
2002	8884.0	1155	92.2	89.9	92.2	89.2	87.8	83.4	8140	92.9
2003	7678.0	1155	78.0	89.2	76.2	88.5	75.9	82.9	6871	78.4
2004	9318.5	1149	93.0	89.4	92.4	88.7	92.3	83.4	8236	93.8
2005	8573.4	1149	86.7	89.3	86.2	88.6	85.2	83.5	7671	87.6
2006	9522.5	1149	96.3	89.6	94.9	88.9	94.6	84.0	8467	96.6
2007	8829.2	1150	89.6	89.6	87.8	88.8	87.6	84.2	7965	90.9
2008	7100.9	1152	71.4	88.8	70.4	88.0	70.2	83.6	6424	73.1
2009	1684.7	1152	16.8	85.8	16.8	85.1	16.7	80.8	1795	20.5
2010	3841.8	1400	32.0	83.2	31.6	82.5	31.3	78.4	4783	54.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		3037		6	281	
B. Refuelling without a maintenance				5	9	
C. Inspection, maintenance or repair combined with refuelling	955			525	79	
D. Inspection, maintenance or repair without refuelling				20		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				83		
H. Nuclear regulatory requirements					45	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					17	
L. Human factor related					0	
Z. Others					4	
Subtotal	955	3037	0	639	435	0
Total		3992			1074	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		19
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		3
14. Safety Systems	470	12
15. Reactor Cooling Systems		21
21. Fuel Handling and Storage Facilities		10
31. Turbine and auxiliaries	2376	196
32. Feedwater and Main Steam System	190	12
35. All other I&C Systems		0
Total	3036	283

SE-4 RINGHALS-1

Operator: RAB (Ringhals AB)

Contractor: ABBATOM (ABBATOM (formerly ASEA-ATOM))

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 855.0 MW(e)
Design Net Capacity: 760.0 MW(e)
Design Discharge Burnup: 41000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3587.6 GW(e).h
Energy Availability Factor: 47.5%
Load Factor: 47.9%
Operating Factor: 51.6%
Energy Unavailability Factor: 52.5%
Total Off-line Time: 4242 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	392.5	613.8	621.5	593.6	57.0	319.2	597.7	32.9	0.0	359.4	3587.6
EAF (%)	0.0	0.0	61.1	99.1	97.1	95.8	8.4	49.6	96.5	5.0	0.0	55.9	47.5
UCF (%)	0.0	0.0	61.5	100.0	100.0	100.0	9.1	52.3	100.0	5.2	0.0	56.2	48.8
LF (%)	0.0	0.0	61.7	99.7	97.7	96.4	9.0	50.2	97.1	5.2	0.0	56.5	47.9
OF (%)	0.0	0.0	74.1	100.0	100.0	100.0	10.6	55.2	100.0	7.5	0.0	69.5	51.6
EUF (%)	100.0	100.0	38.9	0.9	2.9	4.2	91.6	50.4	3.5	95.0	100.0	44.1	52.5
PUF (%)	0.0	0.0	11.4	0.0	0.0	0.0	90.9	47.7	0.0	92.9	72.2	13.3	27.7
UCLF (%)	100.0	100.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	27.8	30.6	23.5
XUF (%)	0.0	0.0	0.4	0.9	2.9	4.2	0.7	2.7	3.5	0.2	0.0	0.2	1.3

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 02 Jan 1969
Date of First Criticality: 20/08/1973
Date of Grid Connection: 14/10/1974
Date of Commercial Operation: 01 Jan 1976

Lifetime Generation: 162868.1 GW(e).h
Cumulative Energy Availability Factor: 70.0%
Cumulative Load Factor: 66.1%
Cumulative Unit Capability Factor: 71.0%
Cumulative Energy Unavailability Factor: 30.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	2164.6	760	32.4	32.4	32.4	32.4	32.4	32.4	4269	48.6
1977	3531.2	760	53.0	42.7	53.0	42.7	53.0	42.7	6095	69.6
1978	4153.1	750	63.2	49.5	63.2	49.5	63.2	49.5	6099	69.6
1979	3868.2	750	58.9	51.8	58.9	51.8	58.9	51.8	6070	69.3
1980	4433.8	750	68.8	55.2	68.2	55.1	67.3	54.9	6362	72.4
1981	4059.4	750	61.8	56.3	61.8	56.2	61.8	56.0	6285	71.7
1982	4687.5	750	74.9	58.9	74.9	58.8	71.3	58.2	7162	81.8
1983	3265.0	750	49.7	57.8	49.7	57.7	49.7	57.2	5372	61.3
1984	4917.7	750	79.8	60.2	79.7	60.1	74.6	59.1	7382	84.0
1985	5168.8	750	86.0	62.8	86.0	62.7	78.7	61.0	7832	89.4
1986	4470.5	750	69.9	63.4	69.9	63.4	68.0	61.7	7203	82.2
1987	4872.7	750	77.7	64.6	77.7	64.6	74.2	62.7	7878	89.9
1988	4694.7	750	75.1	65.4	74.7	65.3	71.3	63.4	7338	83.5
1989	4855.3	755	81.8	66.6	81.8	66.5	73.4	64.1	7963	90.9
1990	4525.6	795	71.6	66.9	71.4	66.9	65.0	64.2	7918	90.4
1991	5638.9	795	82.6	68.0	82.5	67.9	81.0	65.3	8034	91.7
1992	3383.8	795	51.2	66.9	51.2	66.9	48.5	64.2	4938	56.2
1993	3996.4	795	68.5	67.0	68.5	67.0	57.4	63.8	6575	75.1
1994	5389.2	795	78.0	67.6	76.4	67.5	77.4	64.6	7189	82.1
1995	5667.0	826	78.3	68.2	78.2	68.1	78.3	65.3	7697	87.9
1996	6490.9	832	90.3	69.3	90.1	69.2	88.7	66.5	8008	91.2
1997	2035.6	830	97.3	70.7	95.8	70.5	28.0	64.6	2663	30.4
1998	5601.6	830	84.8	71.4	80.7	71.0	77.0	65.2	7605	86.8
1999	4930.4	825	73.3	71.5	68.4	70.8	68.2	65.3	6500	74.2
2000	3239.7	825	57.2	70.8	50.8	70.0	44.7	64.5	4659	53.0
2001	5835.0	825	86.1	71.5	86.1	70.7	80.7	65.1	7814	89.2
2002	5956.2	830	84.7	72.0	80.4	71.0	81.9	65.8	7667	87.5
2003	5104.3	830	70.4	71.9	70.2	71.0	70.2	66.0	6269	71.6
2004	6523.1	830	90.1	72.6	89.7	71.7	89.5	66.8	7974	90.8
2005	6064.8	830	83.9	73.0	83.5	72.1	83.4	67.4	7452	85.1
2006	6518.8	843	89.9	73.6	87.9	72.6	88.3	68.1	7982	91.1
2007	5963.4	843	81.1	73.8	79.4	72.9	80.8	68.5	7275	83.0
2008	4552.7	856	62.1	73.4	60.6	72.5	60.5	68.3	5480	62.4
2009	1314.3	856	17.4	71.7	17.4	70.7	17.5	66.7	1639	18.7
2010	3587.6	855	48.8	71.0	47.5	70.0	47.9	66.1	4518	51.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2038			736	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	1208			983	36	
D. Inspection, maintenance or repair without refuelling	998			1		
E. Testing of plant systems or components					5	
H. Nuclear regulatory requirements						12
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					27	9
L. Human factor related					1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						0
Z. Others					12	
Subtotal	2206	2038	0	984	819	23
Total		4244			1826	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1974 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	221	165
12. Reactor I&C Systems		79
13. Reactor Auxiliary Systems		18
14. Safety Systems	1648	240
15. Reactor Cooling Systems		104
31. Turbine and auxiliaries		28
32. Feedwater and Main Steam System		35
35. All other I&C Systems	141	1
41. Main Generator Systems		0
42. Electrical Power Supply Systems	28	10
XX. Miscellaneous Systems		0
Total	2038	680

SE-5 RINGHALS-2

Operator: RAB (Ringhals AB)

Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 813.0 MW(e)
Design Net Capacity: 820.0 MW(e)
Design Discharge Burnup: 47000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5599.9 GW(e).h
Energy Availability Factor: 78.3%
Load Factor: 78.6%
Operating Factor: 81.8%
Energy Unavailability Factor: 21.7%
Total Off-line Time: 1596 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.2	516.3	581.4	592.8	418.2	572.4	575.0	566.0	595.8	579.5	602.2	5599.9
EAF (%)	0.0	0.2	83.5	99.0	98.2	71.1	94.5	94.7	96.4	98.2	98.7	99.2	78.3
UCF (%)	0.0	0.2	84.3	100.0	100.0	73.9	100.0	100.0	100.0	100.0	100.0	100.0	80.4
LF (%)	0.0	0.0	85.4	99.3	98.0	71.4	94.6	95.1	96.7	98.5	99.0	99.6	78.6
OF (%)	0.0	0.6	100.0	100.0	100.0	74.4	100.0	100.0	100.0	100.0	100.0	100.0	81.8
EUf (%)	100.0	99.8	16.5	1.0	1.8	28.9	5.5	5.3	3.6	1.8	1.3	0.8	21.7
PUF (%)	0.0	0.4	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
UCLF (%)	100.0	99.4	0.0	0.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	0.0	18.3
XUF (%)	0.0	0.0	0.8	1.0	1.8	2.8	5.5	5.3	3.6	1.8	1.3	0.8	2.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

OUTAGE FOR 2009 FINISHED IN FEBRUARY 2010 AFTER INSTALATION OF NEW I&C, IN THE MAIN CONTROL-ROOM.

5. Historical Summary

Date of Construction Start: 10 Jan 1970 **Lifetime Generation:** 181218.7 GW(e).h
Date of First Criticality: 19/06/1974 **Cumulative Energy Availability Factor:** 71.3%
Date of Grid Connection: 17/08/1974 **Cumulative Load Factor:** 67.4%
Date of Commercial Operation: 05 Jan 1975 **Cumulative Unit Capability Factor:** 72.8%
Cumulative Energy Unavailability Factor: 28.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	2162.0	820	44.9	44.9	44.9	44.9	44.8	44.8	3382	57.5
1976	4213.0	822	59.4	53.6	59.4	53.6	58.3	52.9	6167	70.2
1977	4114.4	822	57.1	54.9	57.1	54.9	57.1	54.5	6402	73.1
1978	4094.4	800	58.4	55.8	58.4	55.8	58.4	55.6	6772	77.3
1979	3585.3	800	51.2	54.9	51.2	54.9	51.2	54.6	5541	63.3
1980	4336.9	800	61.7	56.1	61.7	56.1	61.7	55.9	5824	66.3
1981	4093.2	800	58.4	56.4	58.4	56.4	58.4	56.2	6216	71.0
1982	4548.0	800	66.3	57.7	66.3	57.7	64.9	57.4	5922	67.6
1983	3935.3	800	56.2	57.5	56.2	57.5	56.2	57.2	6107	69.7
1984	4178.7	800	68.3	58.6	68.2	58.6	59.5	57.5	6090	69.3
1985	4294.7	800	74.8	60.1	74.8	60.1	61.3	57.8	6680	76.3
1986	3969.1	800	59.4	60.1	59.4	60.1	56.6	57.7	6383	72.9
1987	4216.6	800	65.2	60.5	65.2	60.5	60.2	57.9	7397	84.4
1988	4216.1	800	68.5	61.1	68.5	61.0	60.0	58.1	7368	83.9
1989	3619.6	800	50.0	60.3	50.0	60.3	51.6	57.6	6002	68.5
1990	5064.8	800	66.7	60.7	66.7	60.7	72.3	58.6	6348	72.5
1991	6232.8	875	83.5	62.2	83.5	62.2	81.3	60.0	7909	90.3
1992	5193.4	875	72.1	62.8	72.1	62.8	67.6	60.5	6959	79.2
1993	2650.0	875	37.8	61.4	37.8	61.4	34.6	59.0	3307	37.8
1994	6258.7	875	84.7	62.6	83.0	62.5	81.7	60.2	7429	84.8
1995	6096.6	867	85.6	63.8	84.8	63.7	80.3	61.3	7676	87.6
1996	5723.3	864	84.6	64.8	76.8	64.3	75.4	61.9	7574	86.2
1997	2372.1	864	98.8	66.4	98.2	65.9	31.3	60.5	2748	31.4
1998	6096.4	875	90.5	67.5	82.2	66.6	79.5	61.4	7866	89.8
1999	6445.8	862	92.2	68.5	85.8	67.4	85.4	62.4	8075	92.2
2000	5143.5	862	84.8	69.2	77.0	67.8	67.9	62.6	7284	82.9
2001	6322.7	862	87.0	69.9	85.7	68.5	83.7	63.4	8004	91.4
2002	6540.3	875	89.2	70.6	84.3	69.1	85.3	64.3	8130	92.8
2003	6811.5	875	92.5	71.4	90.9	69.9	88.9	65.2	8093	92.4
2004	6786.6	875	90.3	72.1	90.3	70.6	88.3	66.0	7976	90.8
2005	5784.4	875	78.4	72.3	77.9	70.9	75.5	66.3	6874	78.5
2006	6839.4	867	91.7	72.9	89.7	71.5	90.1	67.1	8107	92.5
2007	6365.1	867	85.2	73.3	83.7	71.9	83.8	67.6	7782	88.8
2008	5746.3	867	79.9	73.5	78.1	72.1	75.5	67.9	7175	81.7
2009	2786.3	813	39.1	72.5	38.6	71.1	39.1	67.1	3432	39.2
2010	5599.9	813	80.4	72.8	78.3	71.3	78.6	67.4	7164	81.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1597			646	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				911		
D. Inspection, maintenance or repair without refuelling				75		
E. Testing of plant systems or components				2		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				88	55	
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability						11
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						7
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					1	
Subtotal	0	1597	0	1076	706	19
Total		1597			1801	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	1412	166
12. Reactor I&C Systems	185	6
14. Safety Systems		91
15. Reactor Cooling Systems		16
16. Steam generation systems		208
21. Fuel Handling and Storage Facilities		43
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System		32
33. Circulating Water System		0
35. All other I&C Systems		0
41. Main Generator Systems		32
42. Electrical Power Supply Systems		27
Total	1597	635

SE-7 RINGHALS-3

Operator: RAB (Ringhals AB)

Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1051.0 MW(e)
 Design Net Capacity: 915.0 MW(e)
 Design Discharge Burnup: 46000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7605.5 GW(e).h
 Energy Availability Factor: 81.9%
 Load Factor: 82.6%
 Operating Factor: 86.6%
 Energy Unavailability Factor: 18.1%
 Total Off-line Time: 1170 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	789.4	711.8	784.6	752.8	767.2	696.0	731.8	636.8	0.0	286.7	663.4	785.0	7605.5
EAF (%)	100.0	100.0	99.5	98.6	97.3	91.1	92.9	80.6	0.0	36.0	86.9	99.6	81.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	96.1	100.0	86.7	0.0	37.1	88.3	100.0	84.0
LF (%)	100.9	100.8	100.3	99.5	98.1	92.0	93.6	81.4	0.0	36.7	87.7	100.4	82.6
OF (%)	100.0	100.0	100.0	100.0	100.0	97.6	100.0	87.6	0.0	54.2	100.0	100.0	86.6
EUF (%)	0.0	0.0	0.5	1.4	2.7	8.9	7.1	19.4	100.0	64.0	13.1	0.4	18.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9	100.0	29.3	0.4	0.0	11.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.4	0.0	33.6	11.3	0.0	4.1
XUF (%)	0.0	0.0	0.5	1.4	2.7	4.9	7.1	6.1	0.0	1.1	1.4	0.4	2.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

AT THE ANNUAL OUTAGE WAS THE I&C OF THE TURBINES CHANGED AND A NEW GENERATOR WAS INSTALLED.

5. Historical Summary

Date of Construction Start: 09 Jan 1972 Lifetime Generation: 182413.3 GW(e).h
 Date of First Criticality: 29/07/1980 Cumulative Energy Availability Factor: 78.1%
 Date of Grid Connection: 09 Jul 1980 Cumulative Load Factor: 73.4%
 Date of Commercial Operation: 09 Sep 1981 Cumulative Unit Capability Factor: 79.7%
 Cumulative Energy Unavailability Factor: 21.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	721.0	920	26.7	26.7	26.7	26.7	26.8	26.8	864	29.5
1982	1251.6	915	15.6	18.4	15.6	18.4	15.6	18.4	3680	42.0
1983	2909.9	867	38.2	26.7	38.2	26.7	38.2	26.7	5886	67.2
1984	5346.6	915	72.4	40.6	72.4	40.6	66.5	38.8	6450	73.4
1985	6090.3	915	84.8	50.9	84.8	50.9	76.0	47.5	7580	86.5
1986	6233.9	915	78.8	56.2	78.8	56.2	77.8	53.2	7026	80.2
1987	6169.2	915	83.1	60.5	83.1	60.5	77.0	57.0	7485	85.4
1988	6151.2	915	77.1	62.8	77.1	62.8	76.5	59.7	7645	87.0
1989	5829.7	915	82.6	65.2	82.6	65.2	72.7	61.3	7757	88.6
1990	5871.3	915	74.2	66.1	74.0	66.1	73.2	62.5	7855	89.7
1991	5923.6	915	75.7	69.1	75.7	67.0	73.9	63.6	8007	91.4
1992	5622.1	915	82.3	68.4	82.3	68.4	69.9	64.2	7941	90.4
1993	6685.8	915	89.8	70.1	89.8	70.1	83.4	65.8	7964	90.9
1994	6873.4	918	86.1	71.4	86.1	71.3	85.5	67.3	8097	92.4
1995	4873.6	918	60.7	70.6	60.7	70.6	60.6	66.8	6040	68.9
1996	6816.8	910	92.5	72.0	87.3	71.7	85.3	68.0	8166	93.0
1997	2284.3	910	95.5	73.5	95.5	73.1	28.7	65.6	2809	32.1
1998	6382.6	915	90.2	74.4	81.3	73.6	79.6	66.4	8008	91.4
1999	6976.0	911	90.0	75.3	88.0	74.4	87.4	67.5	7899	90.2
2000	6165.8	911	92.3	76.2	89.5	75.2	77.1	68.0	7966	90.7
2001	6285.3	911	88.6	76.8	79.4	75.4	78.8	68.6	7942	90.7
2002	6890.6	915	90.8	77.4	88.8	76.0	86.0	69.4	7930	90.5
2003	6714.6	915	85.3	77.8	84.4	76.4	83.8	70.0	7475	85.3
2004	7497.9	915	94.0	78.5	93.9	77.1	93.3	71.0	8295	94.4
2005	7181.6	915	91.2	79.0	90.5	77.7	89.6	71.8	8075	92.2
2006	6570.8	917	81.8	79.1	75.0	77.6	76.4	72.0	7249	82.8
2007	5990.8	1045	67.0	78.6	64.3	77.0	65.4	71.7	6565	74.9
2008	7599.8	985	89.2	79.0	87.8	77.4	87.8	72.3	7980	90.8
2009	8102.9	1044	91.4	79.5	89.7	77.9	89.8	73.0	8093	92.4
2010	7605.5	1051	84.0	79.7	81.9	78.1	82.6	73.4	7590	86.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		257			327	
C. Inspection, maintenance or repair combined with refuelling	912			622	15	
D. Inspection, maintenance or repair without refuelling				250		
E. Testing of plant systems or components				6	1	
H. Nuclear regulatory requirements				2		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
L. Human factor related					4	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					2	
Subtotal	912	257	0	880	349	7
Total		1169			1236	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		29
12. Reactor I&C Systems	16	1
15. Reactor Cooling Systems		51
16. Steam generation systems		153
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries	241	38
32. Feedwater and Main Steam System		14
41. Main Generator Systems		12
42. Electrical Power Supply Systems		22
Total	257	320

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		85			148	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	728			667	1	
D. Inspection, maintenance or repair without refuelling				207		
E. Testing of plant systems or components				37	16	
H. Nuclear regulatory requirements					2	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
L. Human factor related					3	
Z. Others				1	14	
Subtotal	728	85	0	912	184	0
Total		813			1096	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1982 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	85	17
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		3
14. Safety Systems		1
15. Reactor Cooling Systems		75
16. Steam generation systems		30
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		17
Total	85	146

CH-1 BEZNAU-1

Operator: Axpo AG (Kernkraftwerk Beznau)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 365.0 MW(e)
 Design Net Capacity: 350.0 MW(e)
 Design Discharge Burnup: 42000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2674.0 GW(e).h
 Energy Availability Factor: 83.7%
 Load Factor: 83.6%
 Operating Factor: 83.9%
 Energy Unavailability Factor: 16.3%
 Total Off-line Time: 1413 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	273.7	247.1	273.1	263.9	179.6	-1.0	101.0	267.2	259.9	272.0	263.8	273.5	2674.0
EAF (%)	100.0	100.0	100.0	100.0	66.4	0.0	38.4	100.0	99.6	100.0	100.0	100.0	83.7
UCF (%)	100.0	100.0	100.0	100.0	66.4	0.0	38.4	100.0	99.6	100.0	100.0	100.0	83.7
LF (%)	100.8	100.8	100.7	100.4	66.1	-0.4	37.2	98.4	98.9	100.0	100.4	100.7	83.6
OF (%)	100.0	100.0	100.0	100.0	66.7	0.0	40.2	100.0	100.0	100.0	100.0	100.0	83.9
EUUF (%)	0.0	0.0	0.0	0.0	33.6	100.0	61.6	0.0	0.4	0.0	0.0	0.0	16.3
PUF (%)	0.0	0.0	0.0	0.0	33.6	100.0	48.7	0.0	0.0	0.0	0.0	0.0	15.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	12.9	0.0	0.4	0.0	0.0	0.0	1.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 09 Jan 1965
 Date of First Criticality: 30/06/1969
 Date of Grid Connection: 17/07/1969
 Date of Commercial Operation: 09 Jan 1969
 Lifetime Generation: 107012.0 GW(e).h
 Cumulative Energy Availability Factor: 84.4%
 Cumulative Load Factor: 83.9%
 Cumulative Unit Capability Factor: 84.6%
 Cumulative Energy Unavailability Factor: 15.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1969			Data not provided							
1970	1947.0	364	61.1	61.1	61.1	61.1	61.1	61.1	5917	67.5
1971	1700.5	364	59.0	60.0	59.0	60.0	53.3	57.2	5123	58.5
1972	1402.9	280	61.3	60.4	61.3	60.4	57.0	57.2	5391	61.4
1973	1655.0	350	71.6	63.3	71.6	63.3	54.0	56.3	6654	76.0
1974	2346.7	350	78.1	66.3	78.1	66.3	76.5	60.5	7177	81.9
1975	2490.9	350	81.2	68.8	81.2	68.8	81.2	64.0	7490	85.5
1976	2548.1	350	83.5	71.0	83.5	71.0	82.9	66.8	7530	85.7
1977	2596.3	350	85.2	72.8	85.2	72.8	84.7	69.0	7592	86.7
1978	2761.9	350	89.5	74.7	89.5	74.7	90.1	71.4	8031	91.7
1979	2658.8	350	86.1	75.8	86.1	75.8	86.7	72.9	7746	88.4
1980	2650.5	350	85.7	76.7	85.7	76.7	86.2	74.2	7682	87.5
1981	2569.7	350	83.5	77.3	83.5	77.3	83.8	75.0	7486	85.5
1982	2566.9	350	83.5	77.8	83.5	77.8	83.7	75.7	7553	86.2
1983	2551.7	350	83.5	78.2	83.5	78.2	83.2	76.2	7546	86.1
1984	2732.9	350	88.8	78.9	88.8	78.9	88.9	77.1	8001	91.1
1985	2634.3	350	86.0	79.4	86.0	79.4	85.9	77.6	7906	90.3
1986	2496.3	350	81.6	79.5	81.6	79.5	81.4	77.8	7403	84.5
1987	2486.3	350	80.7	79.6	80.7	79.6	81.1	78.0	7256	82.8
1988	2566.5	350	83.0	79.7	83.0	79.7	83.5	78.3	7499	85.4
1989	2433.1	350	78.6	79.7	78.6	79.7	79.4	78.4	7062	80.6
1990	2562.5	350	84.4	79.9	84.4	79.9	83.6	78.6	7506	85.7
1991	2495.3	350	83.5	80.1	83.5	80.1	81.4	78.7	7430	84.8
1992	2477.4	350	81.7	80.1	81.7	80.1	80.6	78.8	7303	83.1
1993	2158.4	350	69.9	79.7	69.4	79.7	70.4	78.5	6241	71.2
1994	2686.9	350	86.2	80.0	85.1	79.9	87.6	78.8	7610	86.9
1995	2850.5	350	90.5	80.4	90.2	80.3	93.0	79.4	7993	91.2
1996	2753.2	353	87.5	80.6	86.8	80.5	88.6	79.7	7704	87.7
1997	2708.2	365	87.5	80.9	85.1	80.7	84.7	79.9	7731	88.3
1998	3183.1	365	99.9	81.6	99.8	81.4	99.6	80.6	8760	100.0
1999	2841.3	365	91.3	81.9	88.6	81.7	88.9	80.9	8074	92.2
2000	2539.2	365	79.2	81.8	78.3	81.5	79.2	80.8	7113	81.0
2001	3090.2	365	96.8	82.3	96.8	82.0	96.6	81.4	8504	97.1
2002	2908.8	365	91.3	82.6	91.0	82.3	91.0	81.7	8000	91.3
2003	3061.8	365	96.9	83.0	96.2	82.7	95.8	82.1	8494	97.0
2004	2801.2	365	87.5	83.2	87.4	82.9	87.4	82.3	7758	88.3
2005	3096.0	365	96.7	83.6	96.6	83.3	96.8	82.7	8491	96.9
2006	2950.7	365	92.3	83.8	92.2	83.5	92.3	82.9	8114	92.6
2007	3081.3	365	96.7	84.1	96.7	83.9	96.4	83.3	8486	96.9
2008	2956.6	365	92.5	84.4	92.5	84.1	92.2	83.5	8143	92.7
2009	3067.3	365	96.3	84.7	96.3	84.4	95.9	83.9	8460	96.6
2010	2674.0	365	83.7	84.6	83.7	84.4	83.6	83.9	7347	83.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		96			223	
B. Refuelling without a maintenance				28		
C. Inspection, maintenance or repair combined with refuelling	1317			891		
D. Inspection, maintenance or repair without refuelling				16		
E. Testing of plant systems or components					0	
Subtotal	1317	96	0	935	223	0
Total		1413			1158	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	96	16
12. Reactor I&C Systems		88
13. Reactor Auxiliary Systems		2
14. Safety Systems		3
15. Reactor Cooling Systems		11
16. Steam generation systems		86
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System		12
35. All other I&C Systems		0
Total	96	220

CH-3 BEZNAU-2

Operator: Axpo AG (Kernkraftwerk Beznau)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 365.0 MW(e)
Design Net Capacity: 350.0 MW(e)
Design Discharge Burnup: 42000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2856.5 GW(e).h
Energy Availability Factor: 89.6%
Load Factor: 89.3%
Operating Factor: 89.8%
Energy Unavailability Factor: 10.4%
Total Off-line Time: 895 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	272.9	246.6	272.6	263.7	271.5	261.2	264.2	141.5	54.8	271.5	263.3	272.7	2856.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	53.4	21.5	100.0	100.0	100.0	89.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	53.4	21.5	100.0	100.0	100.0	89.6
LF (%)	100.5	100.5	100.5	100.3	100.0	99.4	97.3	52.1	20.9	99.8	100.2	100.4	89.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	53.6	23.6	100.0	100.0	100.0	89.8
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.6	78.5	0.0	0.0	0.0	10.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.6	78.5	0.0	0.0	0.0	10.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 01 Jan 1968
Date of First Criticality: 16/10/1971
Date of Grid Connection: 23/10/1971
Date of Commercial Operation: 12 Jan 1971

Lifetime Generation: 106379.4 GW(e).h
Cumulative Energy Availability Factor: 87.3%
Cumulative Load Factor: 87.5%
Cumulative Unit Capability Factor: 87.3%
Cumulative Energy Unavailability Factor: 12.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	174.9	340	94.6	94.6	94.6	94.6	80.8	80.8	690	92.7
1972	2618.5	364	82.7	83.5	82.7	83.5	81.9	81.8	7624	86.8
1973	2220.7	350	78.4	81.1	78.4	81.1	72.4	77.4	7042	80.4
1974	2527.8	350	83.5	81.9	83.5	81.9	82.4	79.0	7607	86.8
1975	2547.0	350	83.1	82.2	83.1	82.2	83.1	80.0	7503	85.7
1976	2652.2	350	86.6	83.0	86.6	83.0	86.3	81.2	7777	88.5
1977	2690.9	350	85.6	83.4	85.6	83.4	87.8	82.3	7758	88.6
1978	2753.1	350	86.7	83.9	86.7	83.9	89.8	83.3	7888	90.0
1979	2700.0	350	86.7	84.2	86.7	84.2	88.1	83.9	7835	89.4
1980	2559.0	350	81.0	83.9	81.0	83.9	83.2	83.9	7279	82.9
1981	2768.8	350	88.8	84.4	88.8	84.4	90.3	84.5	7868	89.8
1982	2722.1	350	87.6	84.7	87.6	84.7	88.8	84.9	7811	89.2
1983	2790.5	350	89.6	85.1	89.6	85.1	91.0	85.4	7977	91.1
1984	2724.2	350	87.5	85.3	87.5	85.3	88.6	85.6	7874	89.6
1985	2629.1	350	84.9	85.2	84.9	85.2	85.7	85.6	7647	87.3
1986	2769.8	350	90.2	85.6	90.2	85.6	90.3	85.9	7983	91.1
1987	2527.6	350	82.4	85.4	82.4	85.4	82.4	85.7	7535	86.0
1988	2630.2	350	84.5	85.3	84.5	85.3	85.6	85.7	7604	86.6
1989	2643.3	350	85.1	85.3	85.1	85.3	86.2	85.7	7614	86.9
1990	2636.1	350	85.3	85.3	85.3	85.3	86.0	85.8	7568	86.4
1991	2619.5	350	84.5	85.3	84.5	85.3	85.4	85.7	7551	86.2
1992	2375.9	350	76.3	84.8	76.3	84.8	77.3	85.3	6836	77.8
1993	2650.9	350	85.1	84.8	84.9	84.8	86.5	85.4	7517	85.8
1994	3062.8	350	98.9	85.5	98.8	85.4	99.9	86.0	8710	99.4
1995	2560.9	350	82.7	85.3	82.6	85.3	83.5	85.9	7247	82.7
1996	2754.1	351	88.5	85.5	87.9	85.4	89.1	86.0	7912	90.1
1997	3090.2	357	99.5	86.0	99.5	86.0	98.8	86.5	8732	99.7
1998	2717.8	357	87.8	86.1	87.3	86.0	86.9	86.6	7755	88.5
1999	2217.2	357	70.7	85.5	70.3	85.5	70.9	86.0	6322	72.2
2000	3071.0	365	96.2	85.9	96.2	85.8	95.8	86.3	8499	96.8
2001	2568.7	365	80.7	85.7	80.7	85.7	80.3	86.1	7107	81.1
2002	3012.0	365	94.6	86.0	94.6	86.0	94.2	86.4	8292	94.7
2003	2920.3	365	92.0	86.2	91.8	86.1	91.3	86.6	8070	92.1
2004	3099.4	365	97.0	86.6	97.0	86.5	96.7	86.9	8556	97.4
2005	2801.0	365	88.0	86.6	87.8	86.5	87.6	86.9	7728	88.2
2006	3073.2	365	97.1	86.9	96.8	86.8	96.1	87.2	8517	97.2
2007	2911.6	365	91.5	87.0	91.5	87.0	91.1	87.3	8063	92.0
2008	3073.4	365	96.2	87.3	96.2	87.2	95.9	87.5	8505	96.8
2009	2758.5	365	86.7	87.3	86.6	87.2	86.3	87.5	7615	86.9
2010	2856.5	365	89.6	87.3	89.6	87.3	89.3	87.5	7865	89.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					80	
B. Refuelling without a maintenance				28	1	
C. Inspection, maintenance or repair combined with refuelling	895			809		
D. Inspection, maintenance or repair without refuelling				35		
J. Grid limitation, failure or grid unavailability						0
L. Human factor related					0	
Subtotal	895	0	0	872	81	0
Total		895			953	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1971 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		1
14. Safety Systems		0
15. Reactor Cooling Systems		9
16. Steam generation systems		24
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		3
35. All other I&C Systems		1
42. Electrical Power Supply Systems		1
Total	0	65

CH-4 GOESGEN

Operator: KKG (KERNKRAFTWERK GOESGEN-DAENIKEN AG)
Contractor: KWU (SIEMENS KRAFTWERK UNION AG)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 970.0 MW(e)
Design Net Capacity: 920.0 MW(e)
Design Discharge Burnup: 52000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8029.1 GW(e).h
Energy Availability Factor: 93.1%
Load Factor: 94.5%
Operating Factor: 93.8%
Energy Unavailability Factor: 6.9%
Total Off-line Time: 540 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	738.5	665.5	732.7	705.8	622.9	220.3	720.9	725.0	707.6	735.5	713.6	740.8	8029.1
EAF (%)	100.0	100.0	100.0	100.0	86.2	30.8	99.9	100.0	100.0	100.0	100.0	100.0	93.1
UCF (%)	100.0	100.0	100.0	100.0	87.3	30.8	100.0	100.0	100.0	100.0	100.0	100.0	93.2
LF (%)	102.3	102.1	101.7	101.1	86.3	31.5	99.9	100.5	101.3	101.8	102.2	102.7	94.5
OF (%)	100.0	100.0	100.0	100.0	87.8	37.6	100.0	100.0	100.0	100.0	100.0	100.0	93.8
EUf (%)	0.0	0.0	0.0	0.0	13.8	69.2	0.1	0.0	0.0	0.0	0.0	0.0	6.9
PUF (%)	0.0	0.0	0.0	0.0	12.7	69.2	0.0	0.0	0.0	0.0	0.0	0.0	6.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

KKG FINISHED THE 20TH YEAR WITHOUT UNPLANNED SCRAM.

5. Historical Summary

Date of Construction Start: 12 Jan 1973 **Lifetime Generation:** 233757.6 GW(e).h
Date of First Criticality: 20/01/1979 **Cumulative Energy Availability Factor:** 88.8%
Date of Grid Connection: 02 Feb 1979 **Cumulative Load Factor:** 89.1%
Date of Commercial Operation: 11 Jan 1979 **Cumulative Unit Capability Factor:** 89.6%
Cumulative Energy Unavailability Factor: 11.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	1255.5	924	93.2	93.2	93.2	93.2	93.2	93.2	1422	97.1
1980	5935.7	920	73.5	76.3	73.5	76.3	73.4	76.3	6819	77.6
1981	6527.6	920	80.7	78.3	80.7	78.3	81.0	78.4	7523	85.9
1982	6436.1	920	79.8	78.8	79.8	78.8	79.9	78.9	7665	87.5
1983	6891.6	920	86.2	80.6	86.2	80.6	85.5	80.5	7790	88.9
1984	7134.8	900	90.6	82.5	89.8	82.3	90.2	82.3	8015	91.2
1985	6747.7	909	85.7	83.0	84.6	82.7	84.7	82.7	7789	88.9
1986	6754.5	941	84.1	83.1	82.8	82.7	81.9	82.6	7386	84.3
1987	6910.3	935	85.2	83.4	84.4	82.9	84.4	82.8	7521	85.9
1988	6859.0	936	84.7	83.5	83.4	83.0	83.4	82.9	7476	85.1
1989	6878.7	931	85.4	83.7	84.3	83.1	84.3	83.0	7514	85.8
1990	7131.5	929	89.4	84.2	87.6	83.5	87.6	83.5	7983	91.1
1991	7141.9	925	89.7	84.7	88.1	83.9	88.1	83.8	7918	90.4
1992	7406.9	934	92.1	85.3	90.2	84.4	90.2	84.3	8107	92.3
1993	7408.1	950	89.3	85.5	88.9	84.7	89.0	84.7	8075	92.2
1994	7661.1	947	92.1	86.0	91.1	85.1	92.3	85.2	8102	92.5
1995	7820.9	971	91.8	86.4	91.1	85.5	91.9	85.6	8109	92.6
1996	7928.4	986	93.4	86.8	91.5	85.9	91.5	86.0	8204	93.4
1997	7967.8	986	93.5	87.2	91.6	86.2	92.2	86.4	8189	93.5
1998	7839.7	986	93.2	87.5	90.8	86.5	90.8	86.6	8179	93.4
1999	7533.9	970	89.9	87.6	88.7	86.6	88.7	86.7	7887	90.0
2000	7804.3	970	92.0	87.9	91.7	86.8	91.6	86.9	8089	92.1
2001	7870.5	970	93.5	88.1	92.6	87.1	92.6	87.2	8206	93.7
2002	7853.3	970	92.9	88.3	92.3	87.3	92.4	87.4	8154	93.1
2003	7988.7	970	94.5	88.6	93.9	87.6	94.0	87.7	8291	94.6
2004	8015.6	970	94.3	88.8	93.8	87.9	94.1	88.0	8300	94.5
2005	7588.2	970	88.4	88.8	88.0	87.9	89.3	88.0	7754	88.5
2006	8099.1	970	93.7	89.0	93.6	88.1	95.3	88.3	8230	93.9
2007	8158.9	970	94.8	89.2	94.6	88.3	96.0	88.6	8313	94.9
2008	7964.0	970	92.6	89.3	92.2	88.4	93.5	88.7	8148	92.8
2009	8072.4	970	94.2	89.5	94.0	88.6	95.0	89.0	8267	94.4
2010	8029.1	970	93.2	89.6	93.1	88.8	94.5	89.1	8220	93.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					32	
C. Inspection, maintenance or repair combined with refuelling	544			748		
E. Testing of plant systems or components				0	0	
J. Grid limitation, failure or grid unavailability						0
Subtotal	544	0	0	748	32	0
Total	544			780		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1979 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
16. Steam generation systems		1
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System		18
41. Main Generator Systems		4
Total	0	30

CH-5 LEIBSTADT

Operator: KKL (KERNKRAFTWERK LEIBSTADT)

Contractor: GETSCO (GENERAL ELECTRIC TECHNICAL SERVICES CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1165.0 MW(e)
 Design Net Capacity: 960.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8774.5 GW(e).h
 Energy Availability Factor: 85.1%
 Load Factor: 86.0%
 Operating Factor: 87.2%
 Energy Unavailability Factor: 14.9%
 Total Off-line Time: 1120 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	876.5	790.4	869.5	835.5	858.3	815.9	782.4	-9.1	318.3	883.7	861.4	891.6	8774.5
EAF (%)	99.8	100.0	100.0	99.6	99.0	97.3	90.3	0.0	37.4	99.5	100.0	100.0	85.1
UCF (%)	99.8	100.0	100.0	100.0	99.8	99.9	98.1	0.0	37.5	99.8	100.0	100.0	86.1
LF (%)	101.1	101.0	100.4	99.6	99.0	97.3	90.3	-1.0	37.9	101.8	102.7	102.9	86.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	99.5	0.0	48.3	100.0	100.0	100.0	87.2
EUUF (%)	0.2	0.0	0.0	0.4	1.0	2.7	9.7	100.0	62.6	0.5	0.0	0.0	14.9
PUF (%)	0.2	0.0	0.0	0.0	0.2	0.1	1.9	100.0	59.4	0.2	0.0	0.0	13.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.3
XUF (%)	0.0	0.0	0.0	0.4	0.8	2.6	7.9	0.0	0.0	0.3	0.0	0.0	1.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 01 Jan 1974 Lifetime Generation: 210995.1 GW(e).h
 Date of First Criticality: 03 Sep 1984 Cumulative Energy Availability Factor: 85.5%
 Date of Grid Connection: 24/05/1984 Cumulative Load Factor: 85.7%
 Date of Commercial Operation: 15/12/1984 Cumulative Unit Capability Factor: 87.3%
 Cumulative Energy Unavailability Factor: 14.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	0.7	1030	100.0	100.0	100.0	100.0	0.1	0.1	744	100.0
1985	6769.3	951	80.1	81.8	80.1	81.8	81.2	74.4	7233	82.6
1986	7209.2	957	83.2	82.5	83.2	82.5	85.9	79.9	7668	87.5
1987	7376.4	990	85.2	83.4	85.2	83.4	85.1	81.6	7917	90.4
1988	7003.5	990	80.0	82.5	80.0	82.5	80.5	81.4	7536	85.8
1989	7364.2	990	85.5	83.1	85.5	83.1	84.9	82.1	7671	87.6
1990	7596.2	990	89.9	84.3	89.9	84.3	87.6	83.0	7905	90.2
1991	7060.3	990	86.0	84.5	81.3	83.8	81.4	82.8	7580	86.5
1992	7537.6	990	90.4	85.2	86.4	84.2	86.7	83.2	7986	90.9
1993	7338.1	990	89.1	85.7	84.4	84.2	84.6	83.4	7898	90.2
1994	6988.2	1003	81.4	85.2	79.4	83.7	79.5	83.0	7108	81.1
1995	7673.8	1030	89.1	85.6	84.2	83.7	85.0	83.2	7819	89.3
1996	7705.1	1030	87.6	85.8	84.8	83.8	85.2	83.4	7734	88.0
1997	7762.5	1030	89.2	86.0	86.2	84.0	86.0	83.6	7830	89.4
1998	8046.2	1030	92.4	86.5	88.2	84.3	89.2	84.0	8102	92.5
1999	8320.0	1080	91.8	86.9	86.8	84.5	87.9	84.3	8126	92.8
2000	8823.2	1115	92.3	87.3	89.5	84.8	90.1	84.7	8159	92.9
2001	9089.8	1115	91.2	87.5	90.4	85.2	93.1	85.2	8187	93.5
2002	9173.8	1115	91.5	87.7	90.8	85.5	93.9	85.7	8250	94.2
2003	9309.3	1165	90.9	87.9	90.1	85.8	91.2	86.1	8204	93.6
2004	8692.0	1165	85.7	87.8	84.9	85.8	84.9	86.0	7633	86.9
2005	5768.1	1165	56.5	86.2	56.3	84.2	56.5	84.4	5004	57.1
2006	9367.0	1165	92.7	86.5	91.7	84.6	91.8	84.8	8206	93.7
2007	9436.8	1165	93.4	86.8	93.2	85.0	92.5	85.2	8276	94.5
2008	9307.6	1165	91.9	87.0	90.7	85.3	91.0	85.4	8119	92.4
2009	9385.0	1165	93.1	87.3	91.7	85.5	92.0	85.7	8203	93.6
2010	8774.5	1165	86.1	87.3	85.1	85.5	86.0	85.7	7640	87.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				0	180	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	1120			702		
D. Inspection, maintenance or repair without refuelling				17		
E. Testing of plant systems or components				0	1	
H. Nuclear regulatory requirements						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2		
L. Human factor related					4	
Subtotal	1120	0	0	721	188	1
Total		1120			910	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		2
15. Reactor Cooling Systems		4
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		6
35. All other I&C Systems		2
41. Main Generator Systems		146
XX. Miscellaneous Systems		0
Total	0	175

CH-2 MUEHLEBERG

Operator: BKW (BKW ENERGIE AG)
Contractor: GETSCO (GENERAL ELECTRIC TECHNICAL SERVICES CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 373.0 MW(e)
Design Net Capacity: 306.0 MW(e)
Design Discharge Burnup: 48000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3008.8 GW(e).h
Energy Availability Factor: 91.3%
Load Factor: 92.1%
Operating Factor: 93.6%
Energy Unavailability Factor: 8.7%
Total Off-line Time: 562 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	277.2	253.5	279.3	270.2	278.4	266.1	270.0	135.0	156.4	280.8	259.4	282.5	3008.8
EAFF (%)	98.8	100.0	99.8	99.9	99.9	99.2	97.3	48.7	58.7	99.6	94.9	99.7	91.3
UCF (%)	98.8	100.0	99.8	99.9	99.9	99.2	100.0	48.7	58.7	99.6	95.0	99.7	91.6
LF (%)	99.9	101.2	100.8	100.6	100.3	99.1	97.3	48.7	58.2	101.0	96.6	101.8	92.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	48.7	75.0	100.0	100.0	100.0	93.6
EUFF (%)	1.2	0.0	0.2	0.1	0.1	0.8	2.7	51.3	41.3	0.4	5.1	0.3	8.7
PUFF (%)	0.6	0.0	0.2	0.1	0.1	0.8	0.0	51.3	32.6	0.1	0.5	0.3	7.3
UCLF (%)	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.3	4.6	0.0	1.2
XUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.2

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

HIGHLIGHTS OF OPERATION DURING THE YEAR IN THE 39TH YEAR OF OPERATION THE NPP MÜHLEBERG WAS ABLE WAS TO KEEP AND CONTINUE THE GOOD RESULT OF THE NUCLEAR POWER OF PREVIOUS YEARS. THE MAXIMUM ANNUAL RESULT REFLECTS THE GOOD CONDITION OF THE PLANT. THE ENERGY PRODUCTION COULD BE SLIGHTLY INCREASED DUE TO THE SHORTER FUEL OUTAGE. IT IS THE HIGHEST SINCE THE COMMISSIONING OF THE PLANT. FROM JANUARY 19 TO 29 AN ON-LINE ON NOBLE METAL CHEMICAL APPLICATION WAS PERFORMED TO PROTECT REACTOR PRESSURE VESSEL INTERNALS. IN EARLY NOVEMBER THE RECIRCULATION PUMP CONTROLS A AND B WERE FIXED.

5. Historical Summary

Date of Construction Start: 03 Jan 1967 **Lifetime Generation:** 96081.6 GW(e).h
Date of First Criticality: 03 Aug 1971 **Cumulative Energy Availability Factor:** 86.7%
Date of Grid Connection: 07 Jan 1971 **Cumulative Load Factor:** 87.2%
Date of Commercial Operation: 11 Jun 1972 **Cumulative Unit Capability Factor:** 87.8%
Cumulative Energy Unavailability Factor: 13.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	387.9	323	92.2	92.2	92.2	92.2	82.0	82.0	1334	91.1
1973	2011.6	306	80.7	82.4	80.7	82.4	75.0	76.1	7315	83.5
1974	1846.2	306	73.2	78.2	73.2	78.2	68.9	72.8	7062	80.6
1975	2344.1	306	87.1	81.0	87.1	81.0	87.4	77.4	7989	91.2
1976	2355.2	306	85.2	82.0	85.2	82.0	87.6	79.8	7960	90.6
1977	2429.3	320	85.7	82.7	85.7	82.7	86.7	81.2	8097	92.4
1978	2465.7	320	87.3	83.5	87.3	83.5	88.0	82.3	8001	91.3
1979	2473.9	320	87.7	84.1	87.7	84.1	88.3	83.2	8024	91.6
1980	2482.4	320	88.5	84.6	88.5	84.6	88.3	83.8	8005	91.1
1981	2539.0	324	89.1	85.2	89.1	85.2	89.5	84.5	8051	91.9
1982	2663.3	326	88.9	85.5	88.9	85.5	93.3	85.4	8017	91.5
1983	2564.3	326	89.6	85.9	89.6	85.9	89.8	85.8	8026	91.6
1984	2527.2	326	88.1	86.1	88.1	86.1	88.3	86.0	7989	90.9
1985	2500.7	323	87.3	86.2	87.2	86.2	88.2	86.1	7882	90.0
1986	2114.5	326	73.7	85.3	73.7	85.3	74.0	85.3	6645	75.9
1987	2465.0	326	85.5	85.3	85.5	85.3	86.3	85.3	7959	90.9
1988	2497.6	326	87.1	85.4	87.1	85.4	87.2	85.5	7968	90.7
1989	2297.5	323	81.3	85.2	81.3	85.2	81.0	85.2	7226	82.5
1990	2477.9	324	86.5	85.2	86.5	85.2	87.3	85.3	7910	90.3
1991	2415.1	323	87.3	85.4	84.8	85.2	85.4	85.3	7714	88.1
1992	2413.5	323	85.0	85.3	85.0	85.2	85.1	85.3	7755	88.3
1993	2568.5	338	88.5	85.5	86.8	85.3	86.5	85.4	7917	90.4
1994	2643.1	355	89.3	85.7	84.9	85.3	85.0	85.3	7952	90.8
1995	2669.0	355	87.8	85.8	85.4	85.3	85.8	85.4	7894	90.1
1996	2649.0	355	87.7	85.9	84.4	85.2	85.0	85.3	7847	89.3
1997	2549.2	355	86.9	85.9	81.8	85.1	82.0	85.2	7671	87.6
1998	2659.7	355	86.5	85.9	85.2	85.1	85.5	85.2	7886	90.0
1999	2702.8	355	87.2	86.0	86.6	85.1	86.9	85.3	8064	92.1
2000	2817.0	355	93.5	86.3	90.1	85.3	90.3	85.5	8290	94.4
2001	2768.7	355	93.3	86.5	88.8	85.5	89.0	85.6	8195	93.6
2002	2828.2	355	91.4	86.7	87.7	85.5	90.9	85.8	8280	94.5
2003	2744.2	355	89.6	86.8	87.7	85.6	88.2	85.9	8034	91.7
2004	2906.1	355	93.3	87.0	92.4	85.8	93.2	86.1	8282	94.3
2005	2855.3	355	92.7	87.2	91.0	86.0	91.8	86.3	8130	92.8
2006	2882.9	355	92.7	87.4	90.9	86.2	92.7	86.5	8174	93.3
2007	2900.4	355	90.6	87.5	90.5	86.3	93.3	86.7	8021	91.6
2008	2973.3	355	91.4	87.6	91.3	86.4	95.3	87.0	8114	92.4
2009	2983.6	373	90.8	87.7	90.7	86.6	91.3	87.1	8025	91.6
2010	3008.8	373	91.6	87.8	91.3	86.7	92.1	87.2	8198	93.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					164	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	562			756		
D. Inspection, maintenance or repair without refuelling				20		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements					0	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	0
Subtotal	562	0	0	778	167	1
Total		562			946	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1971 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		0
14. Safety Systems		2
15. Reactor Cooling Systems		1
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		150
32. Feedwater and Main Steam System		1
35. All other I&C Systems		0
42. Electrical Power Supply Systems		0
Total	0	160

UA-40 KHMELNITSKI-1**Operator:** NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)**Contractor:** PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)**1. Station Details**

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6587.1 GW(e).h
Energy Availability Factor: 78.6%
Load Factor: 79.2%
Operating Factor: 79.5%
Energy Unavailability Factor: 21.4%
Total Off-line Time: 1794 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	721.1	650.8	687.8	696.7	714.5	662.0	676.3	575.4	0.0	0.0	480.4	722.1	6587.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	96.4	96.2	81.6	0.0	0.0	69.7	100.0	78.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	96.7	96.4	87.0	0.0	0.0	69.7	100.0	79.1
LF (%)	102.0	101.9	97.4	101.9	101.1	96.8	95.7	81.4	0.0	0.0	70.2	102.2	79.2
OF (%)	100.0	100.0	100.0	100.0	100.0	98.8	98.4	87.2	0.0	0.0	70.4	100.0	79.5
EUf (%)	0.0	0.0	0.0	0.0	0.0	3.6	3.8	18.4	100.0	100.0	30.3	0.0	21.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	100.0	100.0	30.3	0.0	20.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	3.3	3.6	0.0	0.0	0.0	0.0	0.0	0.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.3	0.2	5.4	0.0	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO EXTERNAL CAUSES: TRANSMISSION LINE LIMITATION - 31GW(E)HMAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: MODERNIZATION OF PRESSURIZER RELIEF VALVE

5. Historical Summary

Date of Construction Start: 11 Jan 1981 **Lifetime Generation:** 132455.0 GW(e).h
Date of First Criticality: 12 Oct 1987 **Cumulative Energy Availability Factor:** 73.3%
Date of Grid Connection: 31/12/1987 **Cumulative Load Factor:** 73.5%
Date of Commercial Operation: 13/08/1988 **Cumulative Unit Capability Factor:** 74.3%
Cumulative Energy Unavailability Factor: 26.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	2133.1	950	67.1	67.1	67.1	67.1	61.1	61.1	2753	75.0
1989	5872.3	950	70.7	69.6	70.6	69.6	70.6	67.8	6295	71.9
1990	6498.6	950	77.4	72.8	77.4	72.8	78.1	72.0	6870	78.4
1991	5172.5	950	61.2	69.4	61.2	69.4	62.2	69.1	5551	63.4
1992	6075.1	950	67.6	69.0	66.5	68.8	72.8	70.0	6167	70.2
1993	5487.7	950	65.2	68.3	65.2	68.1	65.9	69.2	5782	66.0
1994	6303.4	950	76.0	69.5	75.5	69.3	75.7	70.2	6775	77.3
1995	5700.3	950	68.0	69.3	68.0	69.1	68.5	70.0	6014	68.7
1996	4497.9	950	54.2	67.5	53.9	67.3	53.9	68.1	4854	55.3
1997	6152.1	950	72.8	68.1	72.6	67.8	73.9	68.7	6415	73.2
1998	5499.2	950	67.1	68.0	65.8	67.6	66.1	68.5	5904	67.4
1999	5526.7	950	66.8	67.9	66.4	67.5	66.4	68.3	6506	74.3
2000	5899.6	950	74.3	68.4	70.4	67.8	70.7	68.5	6541	74.5
2001	6167.3	950	76.5	69.0	73.6	68.2	73.9	68.9	6781	77.2
2002	6730.5	950	80.3	69.8	79.9	69.0	80.9	69.7	7049	80.5
2003	7137.7	950	85.4	70.8	84.9	70.0	85.8	70.8	7512	85.8
2004	6325.1	950	80.9	71.4	75.4	70.4	75.8	71.1	6935	79.0
2005	6862.8	950	84.9	72.2	84.8	71.2	82.5	71.7	7433	84.9
2006	6684.9	950	83.9	72.8	83.5	71.9	80.3	72.2	7407	84.6
2007	6905.3	950	83.1	73.3	83.0	72.4	83.0	72.7	7297	83.3
2008	6547.2	950	82.3	73.8	81.3	72.9	78.5	73.0	7237	82.4
2009	6380.6	950	80.0	74.1	77.8	73.1	76.7	73.2	7031	80.3
2010	6587.1	950	79.1	74.3	78.6	73.3	79.2	73.5	6966	79.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		21			208	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	1773			1571		
D. Inspection, maintenance or repair without refuelling				201		
E. Testing of plant systems or components				16		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	9
Subtotal	1773	21	0	1788	214	9
Total		1794			2011	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		25
13. Reactor Auxiliary Systems		11
14. Safety Systems		0
15. Reactor Cooling Systems		22
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		12
33. Circulating Water System	9	
35. All other I&C Systems	12	0
41. Main Generator Systems		101
42. Electrical Power Supply Systems		5
Total	21	201

UA-41 KHMELNITSKI-2

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH, VOLGODONSK, RUSSIA)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5873.7 GW(e).h
 Energy Availability Factor: 69.6%
 Load Factor: 70.6%
 Operating Factor: 69.9%
 Energy Unavailability Factor: 30.4%
 Total Off-line Time: 2636 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	723.7	651.1	674.6	0.0	532.6	317.2	0.0	145.3	696.0	718.1	695.8	719.2	5873.7
EAF (%)	100.0	100.0	94.4	0.0	74.8	46.6	0.0	21.9	100.0	100.0	100.0	99.9	69.6
UCF (%)	100.0	100.0	94.4	0.0	74.8	46.9	0.0	21.9	100.0	100.0	100.0	99.9	69.7
LF (%)	102.4	102.0	95.6	0.0	75.4	46.4	0.0	20.6	101.8	101.5	101.7	101.8	70.6
OF (%)	100.0	100.0	94.3	0.0	76.6	47.2	0.0	22.6	100.0	100.0	100.0	100.0	69.9
EUf (%)	0.0	0.0	5.6	100.0	25.2	53.4	100.0	78.1	0.0	0.0	0.0	0.1	30.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	53.1	100.0	78.1	0.0	0.0	0.0	0.0	19.5
UCLF (%)	0.0	0.0	5.6	100.0	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	10.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

MAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: REFUELING MACHINE MODERNIZATION.
 CHANGE OF STATOR WINDING (ALSTOM TECHNOLOGY)

5. Historical Summary

Date of Construction Start: 02 Jan 1985 Lifetime Generation: 38205.0 GW(e).h
 Date of First Criticality: 08 Jan 2004 Cumulative Energy Availability Factor: 75.2%
 Date of Grid Connection: 08 Jul 2004 Cumulative Load Factor: 74.0%
 Date of Commercial Operation: 15/12/2005 Cumulative Unit Capability Factor: 75.9%
 Cumulative Energy Unavailability Factor: 24.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2005	261.4	950	100.0	100.0	100.0	100.0	37.0	37.0	296	39.8
2006	7178.3	950	87.4	88.4	86.2	87.2	86.3	82.4	7697	87.9
2007	7213.4	950	91.2	89.7	89.1	88.1	86.7	84.5	8008	91.4
2008	4944.8	950	59.7	80.0	59.6	78.9	59.3	76.3	5263	59.9
2009	5841.2	950	69.8	77.5	69.5	76.6	70.2	74.8	6126	69.9
2010	5873.7	950	69.7	75.9	69.6	75.2	70.6	74.0	6124	69.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		936			476	
C. Inspection, maintenance or repair combined with refuelling	1700			803		
D. Inspection, maintenance or repair without refuelling				66		
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)					248	
Subtotal	1700	936	0	869	724	0
Total		2636			1593	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
14. Safety Systems		14
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		0
41. Main Generator Systems	936	459
Total	936	476

UA-27 ROVNO-1

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)
Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 381.0 MW(e)
Design Net Capacity: 361.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2087.5 GW(e).h
Energy Availability Factor: 63.7%
Load Factor: 62.5%
Operating Factor: 63.6%
Energy Unavailability Factor: 36.3%
Total Off-line Time: 3188 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	295.0	270.2	281.4	276.8	232.6	265.9	266.1	143.8	0.0	0.0	0.0	55.8	2087.5
EAF (%)	100.0	100.0	99.3	100.0	99.0	98.6	96.9	52.3	0.0	0.0	0.0	20.0	63.7
UCF (%)	100.0	100.0	99.3	100.0	100.0	99.6	99.4	53.8	0.0	0.0	0.0	20.0	64.2
LF (%)	104.1	105.5	99.4	100.9	82.1	96.9	93.9	50.7	0.0	0.0	0.0	19.7	62.5
OF (%)	100.0	100.0	100.0	100.0	89.8	100.0	100.0	54.8	0.0	0.0	0.0	20.6	63.6
EUf (%)	0.0	0.0	0.7	0.0	1.0	1.4	3.1	47.7	100.0	100.0	100.0	80.0	36.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.4	100.0	100.0	100.0	80.0	35.6
UCLF (%)	0.0	0.0	0.7	0.0	0.0	0.5	0.6	0.8	0.0	0.0	0.0	0.0	0.2
XUF (%)	0.0	0.0	0.0	0.0	1.0	0.9	2.5	1.4	0.0	0.0	0.0	0.0	0.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

MAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: UNIT LIFE EXTENSION TILL DECEMBER 22, 2030 (LICENSE ÆFÆ'Ä,ÄÄFÄçÄçÄ€ŠA~Ä,ÄçÄFÆ'E'Ä,ÄÄFÄçÄ,Ä,Ä% 000943 FROM DECEMBER 10, 2010)

5. Historical Summary

Date of Construction Start: 08 Jan 1973 **Lifetime Generation:** 73757.0 GW(e).h
Date of First Criticality: 17/12/1980 **Cumulative Energy Availability Factor:** 76.6%
Date of Grid Connection: 31/12/1980 **Cumulative Load Factor:** 76.2%
Date of Commercial Operation: 21/09/1981 **Cumulative Unit Capability Factor:** 77.3%
Cumulative Energy Unavailability Factor: 23.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	932.3	361	91.0	91.0	91.0	91.0	88.2	88.2	2924	99.9
1982	1725.2	361	51.9	61.7	51.9	61.7	54.6	63.0	5498	62.8
1983	2036.6	361	61.6	61.7	61.6	61.7	64.4	63.6	6752	77.1
1984	2686.3	361	82.5	67.9	82.5	67.9	84.7	69.9	7782	88.6
1985	2664.8	365	81.4	71.1	81.4	71.1	83.3	73.1	7636	87.2
1986	2712.7	361	77.5	72.3	77.5	72.3	85.8	75.4	7606	86.8
1987	3040.8	402	86.6	74.7	86.6	74.7	86.3	77.3	7756	88.5
1988	2718.0	361	86.0	76.3	86.0	76.3	85.7	78.4	7877	89.7
1989	2823.8	361	89.2	77.8	89.2	77.8	89.3	79.7	7994	91.3
1990	2590.6	361	79.3	77.9	79.3	77.9	81.9	80.0	7265	82.9
1991	2640.1	361	81.4	78.3	81.4	78.3	83.5	80.3	7430	84.8
1992	3082.9	403	88.5	79.3	87.3	79.1	87.0	80.9	7989	90.9
1993	2584.4	406	83.0	79.6	81.4	79.3	72.7	80.2	7159	81.7
1994	2578.6	361	81.7	79.7	81.7	79.5	81.5	80.3	7378	84.2
1995	2747.4	361	88.4	80.3	86.1	80.0	86.9	80.8	7756	88.5
1996	2432.0	361	79.0	80.2	76.7	79.8	76.7	80.5	6960	79.2
1997	2701.1	361	82.2	80.4	81.6	79.9	85.4	80.8	7867	89.8
1998	2612.9	361	78.1	80.2	77.8	79.7	82.6	80.9	6912	78.9
1999	2240.5	361	82.8	80.4	82.8	79.9	70.8	80.4	6214	70.9
2000	2733.7	361	85.7	80.6	82.6	80.1	86.2	80.7	7580	86.3
2001	2753.8	381	82.6	80.7	81.4	80.1	82.3	80.7	7369	83.9
2002	2656.2	381	81.0	80.8	79.9	80.1	79.6	80.7	7242	82.7
2003	2816.1	381	84.5	80.9	83.5	80.3	84.4	80.9	7560	86.3
2004	2876.6	381	87.9	81.2	86.5	80.5	86.0	81.1	7914	90.1
2005	2362.6	381	85.8	81.4	84.5	80.7	70.8	80.6	7753	88.5
2006	2493.6	381	78.4	81.3	78.0	80.6	74.7	80.4	7012	80.0
2007	2079.0	381	66.3	80.7	65.7	80.0	62.3	79.7	5882	67.1
2008	2445.7	381	76.2	80.6	75.6	79.9	73.1	79.4	6815	77.6
2009	113.1	381	3.5	77.8	3.5	77.1	3.4	76.7	308	3.5
2010	2087.5	381	64.2	77.3	63.7	76.6	62.5	76.2	5572	63.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					46	
C. Inspection, maintenance or repair combined with refuelling	3088			1347		
D. Inspection, maintenance or repair without refuelling				114	1	
J. Grid limitation, failure or grid unavailability			76			
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						0
L. Human factor related					1	
Subtotal	3088	0	76	1461	48	0
Total		3164			1509	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1981 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		3
14. Safety Systems		0
15. Reactor Cooling Systems		13
16. Steam generation systems		7
32. Feedwater and Main Steam System		0
35. All other I&C Systems		0
41. Main Generator Systems		2
42. Electrical Power Supply Systems		5
Total	0	40

UA-28 ROVNO-2

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)
Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH, VOLGODONSK, RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 376.0 MW(e)
Design Net Capacity: 384.0 MW(e)
Design Discharge Burnup: 28600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1531.7 GW(e).h
Energy Availability Factor: 47.4%
Load Factor: 46.5%
Operating Factor: 48.7%
Energy Unavailability Factor: 52.6%
Total Off-line Time: 4490 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	280.7	101.9	0.0	0.0	274.9	206.2	0.0	0.0	0.0	114.1	272.0	281.9	1531.7
EAF (%)	98.2	41.0	0.0	0.1	97.3	98.9	0.0	0.0	0.0	40.2	96.5	96.3	47.4
UCF (%)	98.2	42.4	0.0	0.1	97.5	99.1	0.0	0.0	0.0	40.2	96.5	96.3	47.6
LF (%)	100.4	40.3	0.0	0.0	98.3	76.2	0.0	0.0	0.0	40.7	100.5	100.8	46.5
OF (%)	100.0	42.9	0.0	0.4	100.0	100.0	0.0	0.0	0.0	41.2	100.0	100.0	48.7
EUf (%)	1.8	59.0	100.0	99.9	2.7	1.1	100.0	100.0	100.0	59.8	3.5	3.7	52.6
PUF (%)	1.3	57.1	100.0	99.9	1.4	0.2	100.0	100.0	100.0	59.8	3.0	3.7	52.2
UCLF (%)	0.5	0.5	0.0	0.0	1.2	0.7	0.0	0.0	0.0	0.0	0.5	0.0	0.3
XUF (%)	0.0	1.4	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO EXTERNAL CAUSES: THE GRID DISPATCHER'S REQUEST - 67 GW(E)H MAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: UNIT LIFE EXTENSION TILL DECEMBER 22, 2031 (LICENSE 000943 FROM DECEMBER 10, 2010)

5. Historical Summary

Date of Construction Start: 10 Jan 1973
Date of First Criticality: 19/12/1981
Date of Grid Connection: 30/12/1981
Date of Commercial Operation: 30/07/1982

Lifetime Generation: 74948.0 GW(e).h
Cumulative Energy Availability Factor: 79.1%
Cumulative Load Factor: 78.0%
Cumulative Unit Capability Factor: 80.2%
Cumulative Energy Unavailability Factor: 20.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	1397.2	384	90.8	90.8	90.8	90.8	82.4	82.4	4403	99.7
1983	1926.9	384	58.0	69.0	58.0	69.0	57.3	65.7	5572	63.6
1984	2808.2	384	83.1	74.6	83.1	74.6	83.3	72.7	7884	89.8
1985	2913.5	384	86.0	77.9	86.0	77.9	86.6	76.7	7994	91.3
1986	2891.8	384	83.0	79.0	83.0	79.0	86.0	78.7	7819	89.3
1987	3166.4	416	86.3	80.4	86.3	80.4	86.9	80.3	7649	87.3
1988	2778.3	384	85.8	81.2	85.8	81.2	82.4	80.6	7875	89.7
1989	2700.4	384	86.3	81.9	86.3	81.9	80.3	80.6	7989	91.2
1990	2799.0	384	83.1	82.0	83.1	82.0	83.2	80.9	7815	89.2
1991	2393.2	384	71.0	80.9	71.0	80.9	71.1	79.9	6560	74.9
1992	2983.7	416	83.8	81.2	82.9	81.1	81.7	80.1	7487	85.2
1993	2053.7	406	66.0	79.8	64.4	79.6	57.7	78.0	5981	68.3
1994	2690.7	384	83.1	80.1	83.1	79.9	80.0	78.2	7626	87.1
1995	2568.5	384	79.6	80.0	76.4	79.6	76.4	78.1	7215	82.4
1996	2783.1	384	87.8	80.6	82.5	79.8	82.5	78.4	7905	90.0
1997	2585.6	384	77.6	80.4	76.5	79.6	76.9	78.3	6847	78.2
1998	2739.6	384	83.2	80.5	81.2	79.7	81.4	78.5	7424	84.7
1999	2543.7	384	78.0	80.4	75.5	79.5	75.6	78.3	6958	79.4
2000	2718.2	384	84.0	80.6	80.3	79.5	80.6	78.4	7460	84.9
2001	2796.9	376	86.6	80.9	83.2	79.7	84.7	78.7	7691	87.6
2002	2861.8	376	86.5	81.2	85.7	80.0	86.9	79.1	7756	88.5
2003	2784.2	376	82.6	81.2	81.6	80.0	84.5	79.4	7376	84.2
2004	2999.7	376	89.4	81.6	88.4	80.4	90.8	79.9	8047	91.6
2005	2549.0	376	86.5	81.8	86.0	80.6	77.4	79.8	7527	85.9
2006	2627.5	376	84.5	81.9	83.3	80.7	79.8	79.8	7727	88.2
2007	2082.9	376	63.7	81.2	62.8	80.1	63.2	79.1	5672	64.7
2008	2650.3	376	81.5	81.2	81.0	80.1	80.2	79.2	7203	82.0
2009	2536.9	376	85.6	81.4	84.8	80.3	77.0	79.1	7603	86.8
2010	1531.7	376	47.6	80.2	47.4	79.1	46.5	78.0	4270	48.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					132	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1844			987		
D. Inspection, maintenance or repair without refuelling	2646			138		
E. Testing of plant systems or components				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				37		4
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)					1	
Subtotal	4490	0	0	1162	133	4
Total		4490			1299	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		16
13. Reactor Auxiliary Systems		2
15. Reactor Cooling Systems		7
16. Steam generation systems		82
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		14
41. Main Generator Systems		2
42. Electrical Power Supply Systems		6
Total	0	129

UA-29 ROVNO-3

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5811.9 GW(e).h
Energy Availability Factor: 74.8%
Load Factor: 69.8%
Operating Factor: 76.8%
Energy Unavailability Factor: 25.2%
Total Off-line Time: 2029 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	697.2	311.8	623.1	655.4	325.3	453.7	662.3	666.9	655.3	596.5	164.3	0.0	5811.9
EAF (%)	99.5	53.7	97.7	97.3	49.0	97.4	95.7	96.0	97.3	86.2	26.4	0.0	74.8
UCF (%)	99.8	54.0	99.5	99.4	50.5	99.5	99.4	99.4	99.4	99.4	40.1	0.0	78.5
LF (%)	98.6	48.8	88.3	95.8	46.0	66.3	93.7	94.4	95.8	84.3	24.0	0.0	69.8
OF (%)	100.0	54.9	100.0	100.0	51.7	73.2	100.0	100.0	100.0	100.0	40.3	0.0	76.8
EUf (%)	0.5	46.3	2.3	2.7	51.0	2.6	4.3	4.0	2.7	13.8	73.6	100.0	25.2
PUF (%)	0.0	0.0	0.0	0.0	49.2	0.0	0.0	0.0	0.0	0.0	59.9	100.0	17.6
UCLF (%)	0.3	46.0	0.5	0.6	0.3	0.5	0.6	0.7	0.6	0.6	0.0	0.0	3.9
XUF (%)	0.3	0.3	1.7	2.1	1.4	2.2	3.7	3.4	2.1	13.1	13.7	0.0	3.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO CONDENSER PROBLEM: 34 GW(E)H AND EXTERNAL CAUSES: THE GRID DISPATCHER'S REQUEST - 193 GW(E)H; COOLING WATER HIGH TEMPERATURE - 111GW(E)H

5. Historical Summary

Date of Construction Start: 02 Jan 1980 **Lifetime Generation:** 133658.0 GW(e).h
Date of First Criticality: 11 Nov 1986 **Cumulative Energy Availability Factor:** 69.8%
Date of Grid Connection: 21/12/1986 **Cumulative Load Factor:** 67.3%
Date of Commercial Operation: 16/05/1987 **Cumulative Unit Capability Factor:** 71.7%
Cumulative Energy Unavailability Factor: 30.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	3961.1	1000	81.3	81.3	81.3	81.3	67.4	67.4	4474	76.1
1988	5661.3	950	71.1	75.3	71.1	75.3	67.8	67.6	6357	72.4
1989	6046.1	950	75.1	75.2	75.1	75.2	72.7	69.5	6771	77.3
1990	6360.1	950	77.3	75.8	77.3	75.8	76.4	71.4	6981	79.7
1991	5454.8	950	66.0	73.7	66.0	73.7	65.5	70.1	5971	68.2
1992	7084.9	1000	82.2	75.3	82.2	75.3	80.7	72.1	7323	83.4
1993	6195.1	950	76.5	75.5	75.9	75.4	74.4	72.4	6861	78.3
1994	5574.7	950	67.7	74.5	67.7	74.4	67.0	71.7	6042	69.0
1995	5018.3	950	61.0	72.9	60.3	72.8	60.3	70.4	5500	62.8
1996	5550.9	950	66.8	72.3	66.5	72.1	66.5	70.0	6064	69.0
1997	6249.6	950	75.9	72.6	74.7	72.4	75.1	70.5	6730	76.8
1998	5603.5	950	68.2	72.3	67.3	71.9	67.3	70.2	6036	68.9
1999	5303.5	950	72.6	72.3	63.7	71.3	63.7	69.7	6342	72.4
2000	4991.3	950	72.4	72.3	59.8	70.5	59.8	69.0	5641	64.2
2001	5783.6	950	75.3	72.5	69.6	70.4	69.3	69.0	6387	72.7
2002	5562.6	950	69.8	72.3	68.4	70.3	66.8	68.9	6320	72.1
2003	6250.5	950	75.2	72.5	74.3	70.5	75.1	69.2	6815	77.8
2004	6693.3	950	84.2	73.1	83.2	71.2	80.2	69.9	7321	83.3
2005	4768.1	950	69.7	73.0	68.3	71.1	57.3	69.2	6158	70.3
2006	4614.0	950	65.6	72.6	64.6	70.7	55.4	68.5	6777	77.4
2007	5317.2	950	67.4	72.3	66.8	70.5	63.9	68.3	6622	75.6
2008	6279.3	950	77.3	72.6	76.8	70.8	75.2	68.6	7097	80.8
2009	3135.0	950	46.4	71.4	42.0	69.6	37.7	67.2	4078	46.6
2010	5811.9	950	78.5	71.7	74.8	69.8	69.8	67.3	6731	76.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		312		71	277	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling	1174			1656		
D. Inspection, maintenance or repair without refuelling	359			122		
E. Testing of plant systems or components				23		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						8
H. Nuclear regulatory requirements					15	
J. Grid limitation, failure or grid unavailability						16
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			193		2	31
Subtotal	1533	312	193	1872	302	55
Total		2038			2229	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		23
12. Reactor I&C Systems		28
13. Reactor Auxiliary Systems		12
15. Reactor Cooling Systems		5
16. Steam generation systems		27
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries	312	24
32. Feedwater and Main Steam System		3
33. Circulating Water System		1
35. All other I&C Systems		0
41. Main Generator Systems		183
42. Electrical Power Supply Systems		33
Total	312	342

UA-69 ROVNO-4

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAA (PRODUCTION AMALGAMATION 'ATOMMASH', VOLGODONSK)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6136.0 GW(e).h
 Energy Availability Factor: 76.1%
 Load Factor: 73.7%
 Operating Factor: 79.9%
 Energy Unavailability Factor: 23.9%
 Total Off-line Time: 1759 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	105.4	460.9	448.6	507.2	513.6	685.6	688.8	677.9	698.7	677.0	672.2	6136.0
EAF (%)	0.0	18.9	72.6	74.3	73.8	76.7	98.2	98.4	100.0	99.7	100.0	96.8	76.1
UCF (%)	0.0	18.9	72.6	74.5	74.2	78.4	99.6	99.4	100.0	99.8	100.0	99.9	76.8
LF (%)	0.0	16.5	65.3	65.6	71.8	75.1	97.0	97.5	99.1	98.7	99.0	95.1	73.7
OF (%)	0.0	20.5	100.0	78.3	74.5	81.3	100.0	100.0	100.0	100.0	100.0	100.0	79.9
EUUF (%)	100.0	81.1	27.4	25.7	26.2	23.3	1.8	1.6	0.0	0.3	0.0	3.2	23.9
PUF (%)	100.0	60.3	0.0	22.1	25.7	19.3	0.0	0.0	0.0	0.0	0.0	0.0	18.7
UCLF (%)	0.0	20.9	27.4	3.4	0.2	2.3	0.4	0.6	0.0	0.3	0.0	0.1	4.5
XUF (%)	0.0	0.0	0.0	0.2	0.3	1.7	1.4	1.0	0.0	0.1	0.0	3.1	0.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO EXTERNAL CAUSES: THE GRID DISPATCHER'S REQUEST - 44 GW(E)H; TRANSMISSION LINE LIMITATION - 45 GW(E)H

5. Historical Summary

Date of Construction Start: 08 Jan 1986 Lifetime Generation: 31749.0 GW(e).h
 Date of First Criticality: 26/09/2004 Cumulative Energy Availability Factor: 66.9%
 Date of Grid Connection: 10 Oct 2004 Cumulative Load Factor: 62.4%
 Date of Commercial Operation: 04 Jun 2006 Cumulative Unit Capability Factor: 69.4%
 Cumulative Energy Unavailability Factor: 33.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
2006	3244.7	950	57.9	57.9	57.0	57.0	51.7	51.7	4326	65.5
2007	5560.9	950	69.6	64.6	69.5	64.1	66.8	60.3	7657	87.4
2008	4368.7	950	66.9	65.4	60.4	62.8	52.4	57.4	7058	80.4
2009	5402.7	950	72.8	67.4	68.9	64.4	64.9	59.4	8171	93.3
2010	6136.0	950	76.8	69.4	76.1	66.9	73.7	62.4	7001	79.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			2006 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					127	
C. Inspection, maintenance or repair combined with refuelling	1139			900		
D. Inspection, maintenance or repair without refuelling	482			163		
H. Nuclear regulatory requirements		139				
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						38
Subtotal	1621	139	0	1063	127	38
Total		1760			1228	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	2006 to 2010 Average Hours Lost Per Year
41. Main Generator Systems		127
Total	0	127

UA-44 SOUTH UKRAINE-1**Operator:** NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)**Contractor:** PAA (PRODUCTION AMALGAMATION 'ATOMMASH', VOLGODONSK)**1. Station Details**

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5151.4 GW(e).h
Energy Availability Factor: 84.6%
Load Factor: 61.9%
Operating Factor: 72.3%
Energy Unavailability Factor: 15.4%
Total Off-line Time: 2425 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	165.5	623.7	686.6	628.6	128.0	477.6	632.1	112.8	90.6	659.9	493.5	452.6	5151.4
EAF (%)	22.7	96.5	96.2	93.5	97.4	93.7	90.8	94.5	99.3	93.6	73.6	65.6	84.6
UCF (%)	22.7	96.5	96.2	96.2	99.2	96.0	93.9	97.4	99.3	95.0	97.1	98.6	90.6
LF (%)	23.4	97.7	97.3	91.9	18.1	69.8	89.4	16.0	13.2	93.2	72.1	64.0	61.9
OF (%)	24.3	100.0	100.0	100.0	26.1	81.0	100.0	21.9	17.5	100.0	100.0	100.0	72.3
EUF (%)	77.3	3.5	3.8	6.5	2.6	6.3	9.2	5.5	0.7	6.4	26.4	34.4	15.4
PUF (%)	76.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
UCLF (%)	0.8	3.5	3.8	3.8	0.8	4.0	6.1	2.6	0.7	5.0	2.9	1.4	2.9
XUF (%)	0.0	0.0	0.0	2.7	1.8	2.3	3.2	2.9	0.0	1.4	23.5	33.0	5.9

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 96 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 160 GW(E)H, THE GRID DISPATCHER'S REQUEST - 1 851 GW(E)H

5. Historical Summary

Date of Construction Start: 03 Jan 1977 **Lifetime Generation:** 145593.0 GW(e).h
Date of First Criticality: 12 Sep 1982 **Cumulative Energy Availability Factor:** 67.7%
Date of Grid Connection: 31/12/1982 **Cumulative Load Factor:** 66.5%
Date of Commercial Operation: 18/10/1983 **Cumulative Unit Capability Factor:** 68.7%
Cumulative Energy Unavailability Factor: 32.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	1582.5	950	75.6	75.6	75.6	75.6	75.4	75.4	1746	79.1
1984	6075.1	950	71.7	72.4	71.7	72.4	72.8	73.3	6364	72.4
1985	6939.1	950	81.4	76.4	81.1	76.3	83.4	77.8	7148	81.6
1986	6176.1	950	74.1	75.7	73.5	75.4	74.2	76.7	6735	76.9
1987	6385.9	1000	75.6	75.7	75.6	75.5	72.9	75.8	6642	75.8
1988	5467.5	950	65.9	73.8	65.9	73.7	65.5	73.8	6177	70.3
1989	2501.6	950	30.8	67.0	30.8	66.9	30.1	66.9	3321	37.9
1990	6174.4	950	75.2	68.1	75.0	68.0	74.2	67.9	7063	80.6
1991	3865.9	950	46.5	65.5	46.5	65.4	46.4	65.3	5532	63.1
1992	4946.8	833	49.2	64.0	49.1	63.8	67.6	65.5	6142	69.9
1993	5277.8	950	62.3	63.8	61.4	63.6	63.4	65.3	5650	64.5
1994	5117.4	950	58.7	63.3	58.7	63.1	61.5	65.0	5667	64.7
1995	5438.6	950	66.1	63.6	65.4	63.3	65.4	65.0	6212	70.9
1996	5138.2	950	62.1	63.5	61.6	63.2	61.6	64.7	5549	63.2
1997	6196.1	950	73.0	64.1	72.5	63.8	74.5	65.4	6416	73.2
1998	6164.9	950	73.7	64.8	73.1	64.5	74.1	66.0	6477	73.9
1999	5558.9	950	67.1	64.9	66.5	64.6	66.8	66.1	5920	67.6
2000	5203.0	950	63.9	64.9	61.2	64.4	62.4	65.8	5677	64.6
2001	5563.7	950	68.3	65.0	66.6	64.5	66.7	65.9	6015	68.5
2002	4254.8	950	52.2	64.4	50.9	63.8	51.1	65.1	4625	52.8
2003	6008.2	950	74.2	64.9	72.6	64.2	72.2	65.5	6612	75.5
2004	6988.9	950	85.0	65.8	84.0	65.2	83.8	66.3	7592	86.4
2005	6068.5	950	78.3	66.4	77.1	65.7	72.9	66.6	6926	79.1
2006	6345.1	950	79.1	66.9	76.9	66.2	76.2	67.0	6988	79.8
2007	5159.8	950	62.7	66.8	61.6	66.0	62.0	66.8	5562	63.5
2008	6895.4	950	85.1	67.5	84.8	66.7	82.6	67.5	7484	85.2
2009	3790.6	950	78.3	67.9	74.2	67.0	45.5	66.6	5368	61.3
2010	5151.4	950	90.6	68.7	84.6	67.7	61.9	66.5	6335	72.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					373	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	563			1409		
D. Inspection, maintenance or repair without refuelling				329		
E. Testing of plant systems or components				9	0	
J. Grid limitation, failure or grid unavailability					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			1862		32	69
Z. Others					1	
Subtotal	563	0	1862	1747	407	69
Total		2425			2223	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1980 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		11
14. Safety Systems		0
15. Reactor Cooling Systems		4
16. Steam generation systems		180
31. Turbine and auxiliaries		54
32. Feedwater and Main Steam System		9
33. Circulating Water System		0
35. All other I&C Systems		1
41. Main Generator Systems		107
42. Electrical Power Supply Systems		1
XX. Miscellaneous Systems		1
Total	0	368

UA-45 SOUTH UKRAINE-2

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAA (PRODUCTION AMALGAMATION 'ATOMMASH', VOLGODONSK)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6461.5 GW(e).h
Energy Availability Factor: 77.7%
Load Factor: 77.6%
Operating Factor: 83.6%
Energy Unavailability Factor: 22.3%
Total Off-line Time: 1434 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	681.9	620.3	680.1	598.6	627.0	157.4	0.0	423.0	655.0	680.6	654.1	683.6	6461.5
EAF (%)	95.4	95.2	94.8	89.4	90.4	23.7	0.0	61.6	96.5	96.4	96.0	95.0	77.7
UCF (%)	95.4	95.2	94.8	89.4	92.5	27.2	0.0	75.2	96.7	96.6	96.4	95.0	79.4
LF (%)	96.5	97.2	96.3	87.5	88.7	23.0	0.0	59.8	95.8	96.2	95.6	96.7	77.6
OF (%)	100.0	100.0	100.0	96.1	100.0	30.3	0.0	78.5	100.0	100.0	100.0	100.0	83.6
EUUF (%)	4.6	4.8	5.2	10.6	9.6	76.3	100.0	38.4	3.5	3.6	4.0	5.0	22.3
PUF (%)	0.0	0.0	0.0	5.0	0.0	70.5	100.0	22.1	0.0	0.0	0.0	0.0	16.6
UCLF (%)	4.6	4.8	5.2	5.6	7.5	2.3	0.0	2.7	3.3	3.4	3.6	5.0	4.0
XUF (%)	0.0	0.0	0.0	0.0	2.1	3.5	0.0	13.6	0.3	0.2	0.3	0.0	1.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 113 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 167 GW(E)H MAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: CHANGE OF LOW PRESSURE SAFETY INJECTION SYSTEM SAFETY VALVE

5. Historical Summary

Date of Construction Start: 10 Jan 1979 **Lifetime Generation:** 134637.0 GW(e).h
Date of First Criticality: 30/12/1984 **Cumulative Energy Availability Factor:** 64.4%
Date of Grid Connection: 01 Jun 1985 **Cumulative Load Factor:** 64.2%
Date of Commercial Operation: 04 Jun 1985 **Cumulative Unit Capability Factor:** 65.6%
Cumulative Energy Unavailability Factor: 35.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	4666.7	950	73.3	73.3	73.3	73.3	74.4	74.4	4924	74.6
1986	5565.5	950	67.0	69.7	66.2	69.3	66.9	70.1	6315	72.1
1987	1641.7	1000	22.0	51.8	22.0	51.6	18.7	50.8	1941	22.2
1988	4850.6	950	57.4	53.3	57.4	53.1	58.1	52.8	5198	59.2
1989	4437.3	950	54.3	53.5	54.3	53.3	53.3	52.9	6674	76.2
1990	1769.0	950	21.9	48.1	21.9	47.9	21.3	47.4	4522	51.6
1991	6209.8	950	72.0	51.6	72.0	51.5	74.6	51.4	6722	76.7
1992	6412.1	1000	72.9	54.4	71.7	54.2	73.0	54.3	6574	74.8
1993	5204.0	950	64.0	55.5	61.7	55.0	62.5	55.2	6570	75.0
1994	3958.5	950	47.3	54.7	46.9	54.2	47.6	54.5	6471	73.9
1995	5429.4	950	66.1	55.7	65.2	55.2	65.2	55.5	6514	74.4
1996	4593.7	950	55.4	55.7	55.0	55.2	55.0	55.4	5590	63.6
1997	6326.5	950	77.2	57.4	75.4	56.8	76.0	57.0	7400	84.5
1998	4542.4	950	55.1	57.2	54.0	56.6	54.6	56.9	4867	55.6
1999	5537.9	950	72.0	58.2	66.4	57.2	66.5	57.5	6372	72.7
2000	4103.5	950	50.0	57.7	49.2	56.7	49.2	57.0	4486	51.1
2001	6206.5	950	74.8	58.7	74.4	57.8	74.4	58.0	6869	78.2
2002	6057.2	950	74.2	59.6	72.7	58.6	72.8	58.8	6565	74.9
2003	5507.7	950	66.2	59.9	65.8	59.0	66.2	59.2	5868	67.0
2004	6899.7	950	86.1	61.2	82.2	60.2	82.7	60.4	7647	87.1
2005	6479.2	950	82.0	62.2	81.1	61.2	77.9	61.2	7243	82.7
2006	6110.2	950	77.5	62.9	75.3	61.8	73.4	61.8	6847	78.2
2007	6241.7	950	78.0	63.6	75.8	62.4	75.0	62.4	6892	78.7
2008	6623.6	950	81.4	64.3	81.1	63.2	79.4	63.1	7248	82.5
2009	6402.8	950	81.6	65.0	81.0	63.9	76.9	63.6	7213	82.3
2010	6461.5	950	79.4	65.6	77.7	64.4	77.6	64.2	7326	83.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					480	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1406			1344		
D. Inspection, maintenance or repair without refuelling	28			435	4	
E. Testing of plant systems or components				10		
H. Nuclear regulatory requirements					0	4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					59	5
L. Human factor related					1	
Subtotal	1434	0	0	1789	544	9
Total		1434			2342	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		8
14. Safety Systems		0
15. Reactor Cooling Systems		28
16. Steam generation systems		366
17. Safety I&C Systems (excluding reactor I&C)		10
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		33
41. Main Generator Systems		8
42. Electrical Power Supply Systems		0
Total	0	475

UA-48 SOUTH UKRAINE-3

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAA (PRODUCTION AMALGAMATION 'ATOMMASH', VOLGODONSK)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5243.2 GW(e).h
Energy Availability Factor: 62.9%
Load Factor: 63.0%
Operating Factor: 77.4%
Energy Unavailability Factor: 37.1%
Total Off-line Time: 1982 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	462.5	57.3	0.0	23.3	632.9	574.3	411.3	435.3	616.1	683.4	646.2	700.7	5243.2
EAF (%)	64.5	8.9	0.0	3.6	88.6	82.6	58.6	62.2	95.2	95.4	93.1	97.4	62.9
UCF (%)	98.6	14.2	0.0	3.6	92.6	98.4	98.5	98.4	99.3	99.1	96.5	99.8	75.4
LF (%)	65.4	9.0	0.0	3.4	89.5	84.0	58.2	61.6	90.1	96.6	94.5	99.1	63.0
OF (%)	100.0	14.4	0.0	10.4	97.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	77.4
EUF (%)	35.5	91.1	100.0	96.4	11.4	17.4	41.4	37.8	4.8	4.6	6.9	2.6	37.1
PUF (%)	0.0	85.6	100.0	92.6	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0
UCLF (%)	1.4	0.2	0.0	3.8	3.5	1.6	1.5	1.7	0.7	0.9	3.5	0.2	1.6
XUF (%)	34.1	5.3	0.0	0.0	3.9	15.9	39.9	36.2	4.1	3.7	3.4	2.5	12.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 58 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 191 GW(E)H

5. Historical Summary

Date of Construction Start: 02 Jan 1985
Date of First Criticality: 09 Jan 1989
Date of Grid Connection: 20/09/1989
Date of Commercial Operation: 29/12/1989

Lifetime Generation: 116114.0 GW(e).h
Cumulative Energy Availability Factor: 70.3%
Cumulative Load Factor: 69.1%
Cumulative Unit Capability Factor: 72.3%
Cumulative Energy Unavailability Factor: 29.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	501.9	950	100.0	100.0	100.0	100.0	71.0	71.0	563	75.7
1990	5691.6	950	69.4	71.8	69.4	71.8	68.4	68.6	6408	73.2
1991	5762.8	950	70.4	71.1	70.0	70.9	69.2	68.9	6996	79.9
1992	6458.1	1000	75.2	72.5	75.2	72.4	73.5	70.5	6646	75.7
1993	6043.4	950	72.8	72.6	71.7	72.2	72.6	71.0	6527	74.5
1994	5565.0	950	66.5	71.4	66.4	71.1	66.9	70.2	6223	71.0
1995	4954.8	950	60.2	69.6	59.5	69.2	59.5	68.4	6300	71.9
1996	6155.0	950	76.4	70.5	73.8	69.8	73.8	69.2	7463	85.0
1997	6514.8	950	79.7	71.7	77.7	70.8	78.3	70.3	7079	80.8
1998	5851.0	950	71.0	71.6	69.9	70.7	70.3	70.3	6396	73.0
1999	5464.3	950	67.2	71.1	65.5	70.2	65.7	69.9	6244	71.3
2000	5909.7	950	73.3	71.3	70.6	70.2	70.8	69.9	6588	75.0
2001	6136.3	950	76.3	71.8	73.7	70.5	73.5	70.2	6985	79.5
2002	6335.2	950	77.5	72.2	76.0	70.9	76.1	70.7	7043	80.4
2003	6036.5	950	74.3	72.3	73.1	71.1	72.5	70.8	6680	76.3
2004	6625.1	950	82.0	73.0	79.9	71.7	79.4	71.4	7246	82.5
2005	6801.0	950	85.7	73.8	85.0	72.5	81.7	72.0	7548	86.2
2006	4290.9	950	53.6	72.6	53.0	71.4	51.6	70.8	4734	54.0
2007	5326.1	950	67.3	72.3	66.1	71.1	64.0	70.5	5978	68.2
2008	4560.8	950	59.7	71.6	58.6	70.4	54.7	69.6	5961	67.9
2009	5343.1	950	82.6	72.2	74.6	70.6	64.2	69.4	7024	80.2
2010	5243.2	950	75.4	72.3	62.9	70.3	63.0	69.1	6778	77.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					288	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	1962			1416		
D. Inspection, maintenance or repair without refuelling	19			299		
E. Testing of plant systems or components				19		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						32
Subtotal	1981	0	0	1734	288	32
Total		1981			2054	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		2
16. Steam generation systems		6
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		0
33. Circulating Water System		0
35. All other I&C Systems		1
41. Main Generator Systems		238
42. Electrical Power Supply Systems		1
Total	0	279

UA-54 ZAPOROZHE-1

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6586.8 GW(e).h
 Energy Availability Factor: 81.9%
 Load Factor: 79.1%
 Operating Factor: 84.4%
 Energy Unavailability Factor: 18.1%
 Total Off-line Time: 1364 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	705.7	642.8	689.0	668.2	311.5	0.0	392.1	674.4	667.5	706.4	587.5	541.7	6586.8
EAF (%)	99.0	99.5	97.2	97.5	44.6	0.0	56.6	95.2	97.3	99.2	98.4	98.6	81.9
UCF (%)	99.0	99.5	97.2	98.4	50.3	0.0	59.5	98.9	99.2	99.2	99.3	99.2	83.3
LF (%)	99.8	100.7	97.6	97.7	44.1	0.0	55.5	95.4	97.6	99.8	85.9	76.6	79.1
OF (%)	100.0	100.0	100.0	100.0	51.6	0.0	61.8	100.0	100.0	100.0	100.0	100.0	84.4
EUUF (%)	1.0	0.5	2.8	2.5	55.4	100.0	43.4	4.8	2.7	0.8	1.6	1.4	18.1
PUF (%)	0.0	0.0	0.0	0.0	48.9	100.0	40.0	0.0	0.0	0.0	0.0	0.1	15.8
UCLF (%)	1.0	0.5	2.8	1.6	0.8	0.0	0.5	1.1	0.8	0.8	0.8	0.7	0.9
XUF (%)	0.0	0.0	0.0	0.8	5.6	0.0	2.8	3.7	1.9	0.0	0.8	0.6	1.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE AN ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 30 GW(E)H; STEAM UNDERHEATING IN MOISTURE SEPARATOR - 20 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER-140GW(E)H, TRANSMISSION LINE LIMITATION-235 GW(E)H

5. Historical Summary

Date of Construction Start: 04 Jan 1980 Lifetime Generation: 132812.0 GW(e).h
 Date of First Criticality: 12 Jul 1984 Cumulative Energy Availability Factor: 64.9%
 Date of Grid Connection: 12 Oct 1984 Cumulative Load Factor: 64.1%
 Date of Commercial Operation: 25/12/1985 Cumulative Unit Capability Factor: 67.1%
 Cumulative Energy Unavailability Factor: 35.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	495.0	950	70.8	70.8	70.8	70.8	70.0	70.0	594	79.8
1986	4826.3	950	61.5	62.3	58.3	59.2	58.0	58.9	5580	63.7
1987	6720.9	1000	80.8	71.4	80.8	69.9	76.7	67.7	7205	82.2
1988	5170.4	950	67.4	70.1	67.2	69.0	62.0	65.9	6225	70.9
1989	0.0	950	0.0	53.2	0.0	52.3	0.0	50.0	0	0.0
1990	4668.7	950	58.8	54.3	56.4	53.1	56.1	51.2	5684	64.9
1991	5332.2	950	68.5	56.6	64.2	54.9	64.1	53.3	6343	72.4
1992	6103.5	950	70.3	58.5	67.8	56.8	73.1	56.0	6739	76.7
1993	4209.7	950	53.5	57.9	52.1	56.2	50.6	55.4	6591	75.2
1994	3771.0	950	45.5	56.5	45.5	55.0	45.3	54.3	5062	57.8
1995	3557.3	950	44.9	55.4	42.7	53.8	42.7	53.1	4213	48.1
1996	4299.5	950	53.5	55.2	51.5	53.6	51.5	53.0	5224	59.5
1997	4070.6	950	53.9	55.1	48.9	53.2	48.9	52.7	5531	63.1
1998	5517.5	950	68.7	56.1	66.3	54.2	66.3	53.7	6122	69.9
1999	5992.5	950	84.0	58.1	72.0	55.5	72.0	55.0	7422	84.7
2000	4222.7	950	52.0	57.7	50.3	55.1	50.6	54.7	4589	52.2
2001	5847.1	950	71.8	58.6	69.9	56.0	70.1	55.7	6434	73.2
2002	6735.0	950	83.2	60.0	80.6	57.5	80.9	57.1	7334	83.7
2003	6596.4	950	81.9	61.2	79.0	58.7	79.3	58.3	7223	82.5
2004	6748.3	950	82.6	62.3	80.6	59.8	80.9	59.5	7290	83.0
2005	6018.8	950	77.8	63.1	76.8	60.6	72.3	60.2	6823	77.9
2006	6899.0	950	83.7	64.1	83.3	61.7	82.9	61.2	7380	84.2
2007	6921.0	950	83.6	65.0	83.5	62.7	83.2	62.2	7406	84.5
2008	6227.7	950	81.4	65.7	80.3	63.5	74.6	62.8	6748	76.8
2009	6584.4	950	83.4	66.4	82.4	64.2	79.1	63.4	7174	81.9
2010	6586.8	950	83.3	67.1	81.9	64.9	79.1	64.1	7396	84.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				303	289	3
B. Refuelling without a maintenance					10	
C. Inspection, maintenance or repair combined with refuelling	1364			1494	30	
D. Inspection, maintenance or repair without refuelling				331	9	
E. Testing of plant systems or components				5		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					3	30
Subtotal	1364	0	0	2133	341	33
Total		1364			2507	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		42
15. Reactor Cooling Systems		29
16. Steam generation systems		378
17. Safety I&C Systems (excluding reactor I&C)		7
31. Turbine and auxiliaries		47
32. Feedwater and Main Steam System		34
33. Circulating Water System		3
35. All other I&C Systems		0
41. Main Generator Systems		33
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		0
Total	0	586

UA-56 ZAPOROZHE-2

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6674.4 GW(e).h
 Energy Availability Factor: 79.8%
 Load Factor: 80.2%
 Operating Factor: 82.0%
 Energy Unavailability Factor: 20.2%
 Total Off-line Time: 1580 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	719.8	642.3	715.0	633.9	699.7	648.4	276.6	0.0	234.5	712.2	684.5	707.5	6674.4
EAF (%)	99.8	99.1	99.7	92.6	98.8	94.7	40.3	0.0	35.7	99.5	99.5	99.5	79.8
UCF (%)	99.8	99.1	99.7	92.6	99.7	98.9	54.0	0.0	36.2	99.5	99.5	99.5	81.4
LF (%)	101.8	100.6	101.3	92.7	99.0	94.8	39.1	0.0	34.3	100.6	100.1	100.1	80.2
OF (%)	100.0	100.0	100.0	93.2	100.0	100.0	54.8	0.0	37.4	100.0	100.0	100.0	82.0
EUF (%)	0.2	0.9	0.3	7.4	1.2	5.3	59.7	100.0	64.3	0.5	0.5	0.5	20.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	45.4	100.0	63.6	0.0	0.0	0.0	17.6
UCLF (%)	0.2	0.9	0.3	7.4	0.4	1.1	0.7	0.0	0.2	0.5	0.5	0.5	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.8	4.1	13.7	0.0	0.5	0.0	0.0	0.0	1.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE AN ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 29 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER-137GW(E)H

5. Historical Summary

Date of Construction Start: 01 Jan 1981 Lifetime Generation: 136274.0 GW(e).h
 Date of First Criticality: 28/06/1985 Cumulative Energy Availability Factor: 69.0%
 Date of Grid Connection: 22/07/1985 Cumulative Load Factor: 67.2%
 Date of Commercial Operation: 15/02/1986 Cumulative Unit Capability Factor: 70.6%
 Cumulative Energy Unavailability Factor: 31.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	5112.9	950	70.9	70.9	68.4	68.4	67.1	67.1	5764	71.9
1987	6058.3	1000	76.0	73.6	76.0	72.5	69.2	68.2	6675	76.2
1988	6088.6	950	81.2	76.2	81.2	75.4	73.0	69.8	7253	82.6
1989	3050.9	950	45.1	68.4	45.1	67.8	36.7	61.5	3393	38.7
1990	1869.1	950	22.6	59.1	22.3	58.6	22.5	53.6	2165	24.7
1991	4583.9	950	56.1	58.6	55.4	58.1	55.1	53.9	5112	58.4
1992	6551.7	950	77.7	61.4	76.2	60.7	78.5	57.4	7016	79.9
1993	4386.1	950	56.6	60.8	53.8	59.8	52.7	56.8	6194	70.7
1994	4103.5	950	49.9	59.6	49.8	58.7	49.3	56.0	5924	67.6
1995	5051.8	950	63.5	60.0	60.7	58.9	60.7	56.5	7329	83.7
1996	5373.0	950	67.5	60.6	64.4	59.4	64.4	57.2	6247	71.1
1997	6081.7	950	76.5	62.0	73.0	60.6	73.1	58.5	6745	77.0
1998	4922.8	950	62.9	62.0	59.0	60.4	59.2	58.6	5601	63.9
1999	5476.0	950	66.9	62.4	65.7	60.8	65.8	59.1	5887	67.2
2000	5626.4	950	70.7	63.0	67.4	61.3	67.4	59.6	6281	71.5
2001	5867.6	950	72.5	63.6	70.6	61.8	70.3	60.3	6422	73.1
2002	6315.6	950	78.8	64.5	75.9	62.7	75.9	61.2	6834	78.0
2003	6742.4	950	83.8	65.5	80.9	63.7	81.0	62.3	7387	84.3
2004	6944.3	950	86.0	66.6	83.1	64.7	83.2	63.4	7531	85.7
2005	6303.2	950	83.4	67.4	82.4	65.6	75.7	64.0	7332	83.7
2006	6644.7	950	83.0	68.2	82.8	66.4	79.8	64.8	7297	83.3
2007	7064.5	950	85.3	69.0	85.1	67.3	84.9	65.7	7528	85.9
2008	6763.5	950	84.6	69.6	84.3	68.0	81.1	66.4	7470	85.0
2009	6127.9	950	81.8	70.2	80.9	68.5	73.6	66.7	7206	82.3
2010	6674.4	950	81.4	70.6	79.8	69.0	80.2	67.2	7180	82.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		49			365	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	1531			1423		
D. Inspection, maintenance or repair without refuelling				459		
E. Testing of plant systems or components				5		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	13
L. Human factor related					0	
Subtotal	1531	49	0	1887	370	13
Total		1580			2270	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		8
16. Steam generation systems		221
17. Safety I&C Systems (excluding reactor I&C)	49	0
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		7
35. All other I&C Systems		7
41. Main Generator Systems		60
42. Electrical Power Supply Systems		4
Total	49	351

UA-78 ZAPOROZHE-3

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)
Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6319.9 GW(e).h
Energy Availability Factor: 78.3%
Load Factor: 75.9%
Operating Factor: 83.8%
Energy Unavailability Factor: 21.7%
Total Off-line Time: 1420 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	671.9	662.1	672.0	632.3	649.5	661.1	656.2	693.5	550.8	470.7	6319.9
EAF (%)	0.0	0.2	96.1	97.9	96.3	95.0	93.9	94.7	96.6	98.4	97.2	68.3	78.3
UCF (%)	0.0	0.2	97.4	99.4	99.3	98.8	98.1	98.3	98.8	99.1	99.1	98.1	82.7
LF (%)	0.0	0.0	95.1	96.8	95.1	92.4	91.9	93.5	95.9	98.0	80.5	66.6	75.9
OF (%)	0.0	0.6	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.1	83.8
EUF (%)	100.0	99.8	3.9	2.1	3.7	5.0	6.1	5.3	3.4	1.6	2.8	31.7	21.7
PUF (%)	100.0	99.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	16.4
UCLF (%)	0.0	0.0	1.5	0.6	0.8	1.3	1.9	1.7	1.2	0.9	0.9	0.6	0.9
XUF (%)	0.0	0.0	1.3	1.5	3.0	3.7	4.2	3.6	2.2	0.7	1.9	29.7	4.4

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE AN ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 76 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER-200GW(E)H, TRANSMISSION LINE LIMITATION-108 GW(E)H

5. Historical Summary

Date of Construction Start: 04 Jan 1982
Date of First Criticality: 12 Apr 1986
Date of Grid Connection: 12 Oct 1986
Date of Commercial Operation: 03 May 1987

Lifetime Generation: 132544.0 GW(e).h
Cumulative Energy Availability Factor: 71.1%
Cumulative Load Factor: 69.2%
Cumulative Unit Capability Factor: 74.0%
Cumulative Energy Unavailability Factor: 28.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	5757.0	1000	80.3	80.3	80.3	80.3	78.4	78.4	5886	80.1
1988	6414.3	950	81.3	80.9	81.3	80.9	76.9	77.6	7077	80.6
1989	6614.4	950	80.9	80.9	80.9	80.9	79.5	78.2	7373	84.2
1990	5625.3	950	68.1	77.6	67.7	77.5	67.6	75.5	6166	70.4
1991	4958.8	950	61.1	74.2	59.9	73.9	59.6	72.2	5877	67.1
1992	4140.9	950	54.0	70.8	50.5	69.9	49.6	68.4	5274	60.0
1993	5416.6	950	67.6	70.3	66.0	69.3	65.1	67.9	7263	82.9
1994	4273.7	950	52.5	68.0	52.5	67.2	51.4	65.8	6068	69.3
1995	4027.8	950	49.7	66.0	48.4	65.1	48.4	63.9	5804	66.3
1996	4940.2	950	62.3	65.6	59.2	64.5	59.2	63.4	6096	69.4
1997	4869.8	950	70.1	66.0	58.5	63.9	58.5	62.9	6544	74.7
1998	4953.2	950	63.1	65.8	59.5	63.6	59.5	62.6	6316	72.1
1999	5114.5	950	64.7	65.7	61.5	63.4	61.5	62.6	6162	70.3
2000	6123.2	950	76.6	66.5	73.0	64.1	73.4	63.3	6875	78.3
2001	6307.8	950	80.9	67.5	75.7	64.9	75.6	64.2	7027	80.0
2002	6602.0	950	84.4	68.5	79.2	65.8	79.3	65.1	7470	85.3
2003	6588.9	950	81.9	69.3	79.0	66.6	79.2	65.9	7236	82.6
2004	6308.7	950	85.4	70.2	75.5	67.1	75.6	66.5	7371	83.9
2005	6224.1	950	84.4	71.0	83.5	67.9	74.8	66.9	7229	82.5
2006	6048.0	950	84.8	71.7	83.3	68.7	72.7	67.2	7031	80.3
2007	6631.4	950	81.7	72.1	80.5	69.3	79.7	67.8	7268	83.0
2008	6843.2	950	85.3	72.7	83.7	69.9	82.0	68.5	7589	86.4
2009	6504.3	950	93.2	73.6	88.9	70.8	78.2	68.9	7996	91.3
2010	6319.9	950	82.7	74.0	78.3	71.1	75.9	69.2	7341	83.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					83	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1412			1403		
D. Inspection, maintenance or repair without refuelling	7			203		
E. Testing of plant systems or components				19	3	
J. Grid limitation, failure or grid unavailability						20
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				1	4	32
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)						10
Subtotal	1419	0	0	1626	97	62
Total		1419			1785	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1987 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		3
14. Safety Systems		5
15. Reactor Cooling Systems		0
16. Steam generation systems		13
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System		12
33. Circulating Water System		1
35. All other I&C Systems		1
41. Main Generator Systems		26
42. Electrical Power Supply Systems		4
XX. Miscellaneous Systems		0
Total	0	71

UA-79 ZAPOROZHE-4

Operator: NNEG (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6388.9 GW(e).h
 Energy Availability Factor: 81.3%
 Load Factor: 76.8%
 Operating Factor: 80.9%
 Energy Unavailability Factor: 18.7%
 Total Off-line Time: 1674 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	701.4	457.3	0.0	131.7	349.1	652.4	672.0	673.4	671.4	706.7	659.5	713.9	6388.9
EAF (%)	99.0	72.9	0.0	20.7	96.5	96.0	95.7	96.1	98.3	99.8	99.6	99.9	81.3
UCF (%)	99.0	92.3	0.0	21.2	97.5	98.5	99.1	99.0	99.5	99.8	99.6	99.9	83.8
LF (%)	99.2	71.6	0.0	19.3	49.4	95.4	95.1	95.3	98.2	99.9	96.4	101.0	76.8
OF (%)	100.0	92.9	0.0	22.2	56.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	80.9
EUf (%)	1.0	27.1	100.0	79.3	3.5	4.0	4.3	3.9	1.7	0.2	0.4	0.1	18.7
PUF (%)	0.0	7.4	100.0	78.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.7
UCLF (%)	1.1	0.3	0.0	0.1	0.1	1.5	0.9	1.0	0.5	0.2	0.4	0.1	0.5
XUF (%)	0.0	19.4	0.0	0.5	1.0	2.5	3.4	2.9	1.2	0.0	0.1	0.0	2.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE AN ENERGY LOSSES DUE TO CONDENSER PRESSURE DEVIATION FROM THE NOMINAL ONE - 29 GW(E)H AND EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 193GW(E)H, THE GRID DISPATCHER'S REQUEST - 324GW(E)H

5. Historical Summary

Date of Construction Start: 04 Jan 1983 Lifetime Generation: 132979.0 GW(e).h
 Date of First Criticality: 15/12/1987 Cumulative Energy Availability Factor: 74.4%
 Date of Grid Connection: 18/12/1987 Cumulative Load Factor: 72.6%
 Date of Commercial Operation: 14/04/1988 Cumulative Unit Capability Factor: 76.9%
 Cumulative Energy Unavailability Factor: 25.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	4798.9	950	79.1	79.1	79.1	79.1	76.5	76.5	5278	80.0
1989	5828.1	950	73.1	75.7	73.1	75.7	70.0	72.8	6613	75.5
1990	6637.3	950	79.8	77.2	78.9	76.8	79.8	75.3	7393	84.4
1991	4259.5	950	51.3	70.3	51.1	70.0	51.2	68.9	5114	58.4
1992	6962.3	1000	78.8	72.1	78.6	71.8	79.3	71.2	6961	79.2
1993	6118.8	950	74.1	72.5	73.4	72.1	73.5	71.6	6821	77.9
1994	5888.7	950	71.4	72.3	71.3	72.0	70.8	71.5	6718	76.7
1995	4717.1	950	58.4	70.5	56.7	70.0	56.7	69.6	5902	67.4
1996	5372.2	950	66.3	70.0	64.4	69.4	64.4	69.0	6372	72.5
1997	6284.4	950	79.9	71.1	75.5	70.0	75.5	69.6	7060	80.6
1998	6022.0	950	74.0	71.3	72.4	70.2	72.4	69.9	6839	78.1
1999	3921.3	950	49.8	69.5	47.1	68.3	47.1	68.0	4630	52.9
2000	6708.4	950	83.8	70.6	80.3	69.2	80.4	68.9	7423	84.5
2001	6091.2	950	89.8	72.0	73.1	69.5	73.0	69.2	7884	89.8
2002	6337.1	950	78.5	72.5	76.1	69.9	76.1	69.7	6895	78.7
2003	6736.3	950	82.4	73.1	80.9	70.6	80.9	70.4	7248	82.7
2004	6537.6	950	88.5	74.0	78.3	71.1	78.3	70.9	7247	82.5
2005	6511.9	950	85.1	74.6	84.1	71.8	78.2	71.3	7498	85.6
2006	6621.8	950	85.2	75.2	84.8	72.5	79.6	71.7	7186	82.0
2007	7027.8	950	87.1	75.8	86.2	73.2	84.4	72.4	7645	87.3
2008	6031.6	950	82.2	76.1	79.6	73.5	72.3	72.4	7265	82.7
2009	6121.3	950	87.3	76.6	86.7	74.1	73.6	72.4	7111	81.2
2010	6388.9	950	83.8	76.9	81.3	74.4	76.8	72.6	7086	80.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					134	
B. Refuelling without a maintenance					28	
C. Inspection, maintenance or repair combined with refuelling	1351			1449		
D. Inspection, maintenance or repair without refuelling	13			122		
E. Testing of plant systems or components				15	0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)			311			61
Subtotal	1364	0	311	1586	162	61
Total		1675			1809	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		4
14. Safety Systems		1
15. Reactor Cooling Systems		9
16. Steam generation systems		16
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System		4
35. All other I&C Systems		0
41. Main Generator Systems		64
42. Electrical Power Supply Systems		4
XX. Miscellaneous Systems		1
Total	0	127

UA-126 ZAPOROZHE-5

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)
Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH, VOLGODONSK, RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6507.6 GW(e).h
Energy Availability Factor: 78.3%
Load Factor: 78.2%
Operating Factor: 80.8%
Energy Unavailability Factor: 21.7%
Total Off-line Time: 1679 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	713.9	644.0	707.7	676.2	696.1	659.9	668.4	578.8	19.2	0.0	422.0	721.5	6507.6
EAF (%)	100.0	100.0	99.2	98.7	98.7	97.2	96.2	83.3	4.7	0.0	62.3	99.9	78.3
UCF (%)	100.0	100.0	99.2	98.8	100.0	99.8	99.6	99.4	6.3	0.0	62.3	99.9	80.4
LF (%)	101.0	100.9	100.3	98.9	98.5	96.5	94.6	81.9	2.8	0.0	61.7	102.1	78.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	6.7	0.0	63.6	100.0	80.8
EUf (%)	0.0	0.0	0.8	1.3	1.3	2.8	3.8	16.7	95.3	100.0	37.7	0.1	21.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.7	100.0	37.5	0.0	19.3
UCLF (%)	0.0	0.0	0.8	1.2	0.0	0.2	0.4	0.6	0.0	0.0	0.2	0.1	0.3
XUF (%)	0.0	0.0	0.0	0.1	1.3	2.6	3.4	16.1	1.6	0.0	0.0	0.0	2.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 139GW(E)HMAJOR ACHIEVEMENTS LEADING TO INCREASED AVAILABILITY: RUST-PREVENTING PAINT OF CONDENSER TUBES

5. Historical Summary

Date of Construction Start: 11 Jan 1985 **Lifetime Generation:** 125200.0 GW(e).h
Date of First Criticality: 20/07/1989 **Cumulative Energy Availability Factor:** 74.6%
Date of Grid Connection: 14/08/1989 **Cumulative Load Factor:** 73.8%
Date of Commercial Operation: 27/10/1989 **Cumulative Unit Capability Factor:** 76.2%
Cumulative Energy Unavailability Factor: 25.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	1670.0	950	83.1	83.1	83.1	83.1	79.6	79.6	1957	88.6
1990	4678.7	950	57.9	63.0	56.6	62.0	56.2	60.9	6002	68.5
1991	6554.9	950	79.5	70.3	78.4	69.3	78.8	68.8	7319	83.6
1992	6898.8	1000	80.1	73.4	79.2	72.4	78.5	71.9	7032	80.1
1993	5661.8	950	68.9	72.4	68.3	71.5	68.0	71.0	6735	76.9
1994	4858.9	950	59.1	69.9	59.1	69.1	58.4	68.7	6779	77.4
1995	5391.9	950	66.0	69.3	64.7	68.4	64.8	68.0	6506	74.3
1996	6126.0	950	74.1	69.9	73.4	69.1	73.4	68.8	6799	77.4
1997	6381.5	950	76.2	70.7	75.8	69.9	76.7	69.7	6705	76.5
1998	5856.2	950	70.7	70.7	70.1	69.9	70.4	69.8	6249	71.3
1999	5070.2	950	63.0	70.0	60.6	69.0	60.9	68.9	5525	63.1
2000	6286.6	950	77.9	70.7	74.9	69.6	75.3	69.5	6928	78.9
2001	5890.8	950	76.2	71.1	70.7	69.6	70.6	69.6	6751	76.9
2002	6222.5	950	80.8	71.8	74.5	70.0	74.8	70.0	6983	79.7
2003	6585.5	950	80.2	72.4	79.0	70.6	79.1	70.6	7107	81.1
2004	6826.7	950	85.6	73.3	81.6	71.4	81.8	71.4	7551	86.0
2005	6278.9	950	81.5	73.8	80.8	71.9	75.4	71.6	6975	79.6
2006	6713.6	950	83.7	74.4	83.3	72.6	80.7	72.1	7297	83.3
2007	6936.5	950	84.3	74.9	84.3	73.2	83.4	72.7	7408	84.6
2008	6935.9	950	87.6	75.6	86.9	73.9	83.1	73.3	7708	87.8
2009	6700.8	950	84.9	76.0	83.0	74.4	80.5	73.6	7445	85.0
2010	6507.6	950	80.4	76.2	78.3	74.6	78.2	73.8	7081	80.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					83	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1679			1333		
D. Inspection, maintenance or repair without refuelling				212		
E. Testing of plant systems or components				22		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	19
Subtotal	1679	0	0	1567	91	19
Total		1679			1677	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		7
14. Safety Systems		1
15. Reactor Cooling Systems		7
16. Steam generation systems		38
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		7
32. Feedwater and Main Steam System		7
41. Main Generator Systems		6
42. Electrical Power Supply Systems		5
Total	0	79

UA-127 ZAPOROZHE-6

Operator: NNEGC (NATIONAL NUCLEAR ENERGY GENERATING COMPANY <ENERGOATOM>)

Contractor: PAIP (PRODUCTION AMALGAMATION IZHORSKY PLANT ATOMMASH,VOLGODONSK,RUSSIA)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 950.0 MW(e)
Design Net Capacity: 950.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6583.5 GW(e).h
Energy Availability Factor: 80.3%
Load Factor: 79.1%
Operating Factor: 82.0%
Energy Unavailability Factor: 19.7%
Total Off-line Time: 1579 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	720.4	658.9	678.8	244.3	0.0	215.8	706.4	708.7	702.2	738.2	632.3	577.6	6583.5
EAF (%)	99.1	100.0	95.9	36.7	0.0	33.0	99.5	99.8	100.0	100.0	100.0	99.5	80.3
UCF (%)	99.1	100.0	100.0	49.8	0.0	33.0	100.0	100.0	100.0	100.0	100.0	100.0	81.8
LF (%)	101.9	103.2	96.2	35.7	0.0	31.5	100.0	100.3	102.7	104.3	92.4	81.7	79.1
OF (%)	100.0	100.0	100.0	50.0	0.0	34.0	100.0	100.0	100.0	100.0	100.0	100.0	82.0
EUUF (%)	0.9	0.0	4.1	63.3	100.0	67.0	0.5	0.2	0.0	0.0	0.0	0.5	19.7
PUF (%)	0.0	0.0	0.0	50.2	100.0	67.0	0.0	0.0	0.0	0.0	0.0	0.0	18.1
UCLF (%)	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	4.1	13.1	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.5	1.5

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

THERE WAS THE NPP OPERATION AT FULL POWER IN BASE LOAD MODE. BUT THERE WERE ENERGY LOSSES DUE TO EXTERNAL CAUSES: HIGH TEMPERATURE OF COOLING WATER - 112 GW(E)H, TRANSMISSION LINE LIMITATION - 184 GW(E)H

5. Historical Summary

Date of Construction Start: 06 Jan 1986 **Lifetime Generation:** 93594.0 GW(e).h
Date of First Criticality: 10 Jun 1995 **Cumulative Energy Availability Factor:** 79.5%
Date of Grid Connection: 19/10/1995 **Cumulative Load Factor:** 78.1%
Date of Commercial Operation: 16/09/1996 **Cumulative Unit Capability Factor:** 81.4%
Cumulative Energy Unavailability Factor: 20.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1996	2359.7	950	86.4	86.4	84.8	84.8	84.8	84.8	84.8	84.8	2540	86.7
1997	6332.7	950	75.5	78.2	75.2	77.6	76.1	78.3	76.1	78.3	6640	75.8
1998	6132.2	950	76.2	77.4	73.4	75.8	73.7	76.3	73.7	76.3	6766	77.2
1999	6165.4	950	78.4	77.7	74.1	75.3	74.1	75.6	74.1	75.6	6934	79.2
2000	5844.2	950	70.1	75.9	69.3	73.9	70.0	74.3	70.0	74.3	6191	70.5
2001	6336.2	950	80.1	76.7	75.2	74.2	75.9	74.6	75.9	74.6	7118	81.0
2002	6790.6	950	83.4	77.8	81.0	75.2	81.6	75.7	81.6	75.7	7393	84.4
2003	7006.4	950	86.3	78.9	83.5	76.3	84.2	76.9	84.2	76.9	7590	86.6
2004	6867.8	950	87.4	79.9	81.7	77.0	82.3	77.5	82.3	77.5	7715	87.8
2005	5850.7	950	84.5	80.4	83.5	77.7	70.3	76.8	70.3	76.8	6557	74.9
2006	6855.0	950	84.0	80.8	83.6	78.3	82.4	77.3	82.4	77.3	7317	83.5
2007	6756.3	950	83.4	81.0	83.3	78.7	81.2	77.7	81.2	77.7	7275	83.0
2008	6355.3	950	83.9	81.2	83.7	79.1	76.2	77.5	76.2	77.5	6888	78.4
2009	6964.6	950	83.0	81.4	82.9	79.4	83.7	78.0	83.7	78.0	7285	83.2
2010	6583.5	950	81.8	81.4	80.3	79.5	79.1	78.1	79.1	78.1	7181	82.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					32	
C. Inspection, maintenance or repair combined with refuelling	1578			1225		
D. Inspection, maintenance or repair without refuelling				83		
E. Testing of plant systems or components				28		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						85
Subtotal	1578	0	0	1336	32	85
Total		1578			1453	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1995 to 2010 Average Hours Lost Per Year
15. Reactor Cooling Systems		3
16. Steam generation systems		11
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		0
35. All other I&C Systems		0
41. Main Generator Systems		2
42. Electrical Power Supply Systems		2
XX. Miscellaneous Systems		1
Total	0	28

GB-18A DUNGENESS-B1

Operator: BE (BRITISH ENERGY)

Contractor: APC (ATOMIC POWER CONSTRUCTION LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 520.0 MW(e)
 Design Net Capacity: 607.0 MW(e)
 Design Discharge Burnup: 19000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 948.9 GW(e).h
 Energy Availability Factor: 20.8%
 Load Factor: 20.8%
 Operating Factor: 36.9%
 Energy Unavailability Factor: 79.2%
 Total Off-line Time: 5527 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.5	217.6	225.7	214.4	211.7	948.9
EAF (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	20.6	58.1	58.2	57.3	54.7	20.8
UCF (%)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	20.6	58.1	58.2	57.3	54.7	20.8
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	58.1	58.3	57.3	54.7	20.8
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.0	100.0	100.0	100.0	100.0	36.9
EUf (%)	100.0	100.0	99.9	100.0	100.0	100.0	100.0	79.4	41.9	41.8	42.7	45.3	79.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	100.0	100.0	99.9	100.0	100.0	100.0	100.0	79.4	41.9	41.8	42.7	45.3	79.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 10 Jan 1965 Lifetime Generation: 74367.0 GW(e).h
 Date of First Criticality: 23/12/1982 Cumulative Energy Availability Factor: 43.1%
 Date of Grid Connection: 04 Mar 1983 Cumulative Load Factor: 42.3%
 Date of Commercial Operation: 04 Jan 1985 Cumulative Unit Capability Factor: 44.8%
 Cumulative Energy Unavailability Factor: 56.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	1826.2	450	64.8	64.8	62.8	62.8	61.9	61.9	4443	67.8
1986	1172.6	450	33.7	47.0	29.1	43.5	29.8	43.6	4447	50.9
1987	210.3	450	13.2	34.6	6.5	29.9	5.2	29.5	1179	13.2
1988	1233.9	450	45.5	37.5	33.3	30.8	31.4	30.0	3857	44.2
1989	647.2	412	43.8	38.7	24.8	29.6	18.0	27.6	2650	30.3
1990	758.0	360	26.3	36.9	26.3	29.1	24.1	27.1	5093	58.3
1991	2656.2	410	74.5	42.3	74.5	35.6	74.0	33.8	7329	83.9
1992	1052.3	441	27.5	40.3	27.4	34.5	26.7	32.8	2670	30.0
1993	3493.2	516	77.5	45.3	77.1	40.2	77.5	38.8	7138	81.7
1994	2385.7	555	51.5	46.0	49.2	41.4	49.2	40.1	4676	53.5
1995	873.7	555	18.2	42.9	18.2	38.8	17.9	37.6	1587	18.1
1996	2517.0	555	51.6	43.8	51.6	40.1	51.6	39.1	5311	60.5
1997	2078.2	555	42.9	43.7	42.9	40.3	42.6	39.4	4549	51.8
1998	2198.3	555	47.4	44.0	47.0	40.9	45.1	39.9	5716	65.1
1999	1584.2	555	33.0	43.2	33.0	40.3	32.5	39.3	4752	54.1
2000	409.6	555	8.4	40.7	8.4	38.0	8.4	37.1	1201	13.7
2001	3049.1	555	62.2	42.1	61.9	39.6	62.5	38.8	7108	80.9
2002	2167.6	555	45.6	42.3	45.5	40.0	44.6	39.1	5043	57.6
2003	2482.9	555	54.6	43.1	51.9	40.7	51.1	39.8	5212	59.5
2004	3082.5	555	63.8	44.2	63.8	42.0	63.2	41.2	6305	71.8
2005	2955.1	555	61.7	45.1	61.6	43.0	60.8	42.2	6039	68.9
2006	2453.8	555	51.7	45.5	51.6	43.4	51.2	42.6	5246	59.9
2007	2981.3	545	63.3	46.3	63.3	44.4	62.4	43.6	6447	73.6
2008	1999.9	520	43.7	46.2	43.7	44.3	43.3	43.6	4467	50.9
2009	1627.0	520	36.0	45.8	36.0	44.0	35.7	43.2	3527	40.3
2010	948.9	520	20.8	44.8	20.8	43.1	20.8	42.3	3233	36.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		5520			878	
B. Refuelling without a maintenance				146	89	
C. Inspection, maintenance or repair combined with refuelling				670	245	
D. Inspection, maintenance or repair without refuelling				916	69	
E. Testing of plant systems or components					5	5
H. Nuclear regulatory requirements				290		
J. Grid limitation, failure or grid unavailability						7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	4
L. Human factor related					8	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					6	
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)					5	
Z. Others				105	37	
Subtotal	0	5520	0	2127	1351	16
Total		5520			3494	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	5520	
12. Reactor I&C Systems		40
13. Reactor Auxiliary Systems		15
14. Safety Systems		1
15. Reactor Cooling Systems		21
16. Steam generation systems		55
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries		60
32. Feedwater and Main Steam System		526
33. Circulating Water System		21
41. Main Generator Systems		102
42. Electrical Power Supply Systems		17
XX. Miscellaneous Systems		0
Total	5520	865

GB-18B DUNGNESS-B2

Operator: BE (BRITISH ENERGY)

Contractor: APC (ATOMIC POWER CONSTRUCTION LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 520.0 MW(e)
 Design Net Capacity: 607.0 MW(e)
 Design Discharge Burnup: 18000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2766.0 GW(e).h
 Energy Availability Factor: 60.2%
 Load Factor: 60.7%
 Operating Factor: 70.5%
 Energy Unavailability Factor: 39.8%
 Total Off-line Time: 2587 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	120.6	400.0	372.6	215.6	144.2	393.0	319.8	78.3	276.4	273.9	171.8	2766.0
EAF (%)	0.0	33.8	100.0	99.2	55.7	38.5	100.0	82.3	20.9	71.3	73.1	44.4	60.2
UCF (%)	0.0	33.8	100.0	99.2	55.7	38.5	100.0	82.4	20.9	71.3	73.2	44.4	60.2
LF (%)	0.0	34.5	103.4	99.5	55.7	38.5	101.6	82.7	20.9	71.4	73.1	44.4	60.7
OF (%)	0.0	39.3	100.0	100.0	66.0	54.2	100.0	80.6	16.7	85.5	100.0	100.0	70.5
EUf (%)	100.0	66.2	0.0	0.8	44.3	61.5	0.0	17.7	79.1	28.7	26.9	55.6	39.8
PUF (%)	0.0	0.0	0.0	0.0	34.8	16.6	0.0	0.0	0.0	4.4	11.4	0.7	5.7
UCLF (%)	100.0	66.2	0.0	0.8	9.5	44.9	0.0	17.7	79.1	24.3	15.5	54.9	34.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 10 Jan 1965 Lifetime Generation: 79512.0 GW(e).h
 Date of First Criticality: 12 Apr 1985 Cumulative Energy Availability Factor: 50.9%
 Date of Grid Connection: 29/12/1985 Cumulative Load Factor: 51.0%
 Date of Commercial Operation: 04 Jan 1989 Cumulative Unit Capability Factor: 51.1%
 Cumulative Energy Unavailability Factor: 49.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1989	0.0	412	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
1990	726.0	360	23.1	12.6	23.1	12.6	23.1	12.6	23.1	4060	46.5
1991	1467.2	410	44.8	24.9	44.8	24.9	40.9	23.4	4295	49.2	
1992	2360.4	441	62.0	35.9	61.9	35.9	59.9	34.2	6525	73.3	
1993	2306.7	517	50.2	39.5	50.0	39.4	51.0	38.5	4672	53.5	
1994	2568.3	555	57.1	43.3	57.0	43.2	53.0	41.6	5075	58.1	
1995	773.8	555	16.1	38.5	16.1	38.4	15.9	37.0	1358	15.5	
1996	3615.0	555	74.2	43.8	74.1	43.8	74.2	42.6	6882	78.3	
1997	3327.3	555	68.5	47.1	68.3	47.0	68.3	46.0	6975	79.4	
1998	1897.8	555	39.2	46.1	39.2	46.1	38.9	45.1	4390	50.0	
1999	2123.3	555	30.6	44.5	30.6	44.5	43.6	45.0	5504	62.7	
2000	1814.3	555	37.2	43.9	37.2	43.8	37.2	44.2	3767	42.9	
2001	3007.4	555	62.1	45.4	61.1	45.3	61.7	45.7	6393	72.8	
2002	2483.3	555	51.8	45.9	51.8	45.8	51.1	46.2	5135	58.6	
2003	3747.3	555	78.3	48.3	76.0	48.0	77.1	48.4	7275	83.0	
2004	3514.4	555	72.6	50.0	72.6	49.7	72.1	50.0	7138	81.3	
2005	2739.7	555	57.7	50.4	57.7	50.2	56.4	50.4	5612	64.1	
2006	2695.7	555	57.9	50.9	56.9	50.6	56.2	50.8	5712	65.2	
2007	2875.7	545	60.9	51.4	60.9	51.2	60.2	51.3	6301	71.9	
2008	1568.9	520	34.4	50.6	34.4	50.3	33.9	50.4	3356	38.2	
2009	2385.7	520	52.6	50.7	52.6	50.4	52.4	50.5	5597	63.9	
2010	2766.0	520	60.2	51.1	60.2	50.9	60.7	51.0	6173	70.5	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		888			529	
B. Refuelling without a maintenance	336			168	133	
C. Inspection, maintenance or repair combined with refuelling				817	170	
D. Inspection, maintenance or repair without refuelling				776		
E. Testing of plant systems or components						20
H. Nuclear regulatory requirements		120		365		
J. Grid limitation, failure or grid unavailability					1	12
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				21		9
P. Fire		1152			34	
Z. Others				73	12	
Subtotal	336	2160	0	2220	879	41
Total		2496			3140	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		52
13. Reactor Auxiliary Systems		1
15. Reactor Cooling Systems		20
16. Steam generation systems		66
17. Safety I&C Systems (excluding reactor I&C)		0
21. Fuel Handling and Storage Facilities		14
31. Turbine and auxiliaries	48	21
32. Feedwater and Main Steam System	48	212
33. Circulating Water System		75
41. Main Generator Systems	672	0
42. Electrical Power Supply Systems	120	6
XX. Miscellaneous Systems		44
Total	888	520

GB-19A HARTLEPOOL-A1

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP)
at the beginning of 2010: 595.0 MW(e)
Design Net Capacity: 625.0 MW(e)
Design Discharge Burnup: 24000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4407.4 GW(e).h
Energy Availability Factor: 84.2%
Load Factor: 84.6%
Operating Factor: 86.2%
Energy Unavailability Factor: 15.8%
Total Off-line Time: 1213 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	446.0	161.6	398.0	432.9	434.4	429.5	318.0	262.8	427.5	363.9	290.2	442.7	4407.4
EAF (%)	99.9	40.0	89.1	100.0	97.5	100.0	71.6	59.3	99.8	82.1	67.5	99.8	84.2
UCF (%)	99.9	40.1	89.1	100.0	97.5	100.0	71.6	59.4	99.8	82.1	67.5	99.8	84.2
LF (%)	100.7	40.4	89.9	101.1	98.1	100.3	71.8	59.4	99.8	82.2	67.7	100.0	84.6
OF (%)	100.0	40.8	95.3	100.0	100.0	100.0	72.3	65.3	100.0	85.9	70.7	100.0	86.2
EUf (%)	0.1	60.0	10.9	0.0	2.5	0.0	28.4	40.7	0.2	17.9	32.5	0.2	15.8
PUf (%)	0.1	52.9	5.7	0.0	0.1	0.0	28.4	9.7	0.2	0.7	0.7	0.2	7.9
UCLF (%)	0.0	7.1	5.2	0.0	2.4	0.0	0.0	30.9	0.0	17.2	31.8	0.0	7.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 10 Jan 1968 **Lifetime Generation:** 81873.0 GW(e).h
Date of First Criticality: 24/06/1983 **Cumulative Energy Availability Factor:** 69.3%
Date of Grid Connection: 08 Jan 1983 **Cumulative Load Factor:** 67.2%
Date of Commercial Operation: 04 Jan 1989 **Cumulative Unit Capability Factor:** 69.4%
Cumulative Energy Unavailability Factor: 30.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	1315.7	539	72.8	72.8	72.8	72.8	39.1	39.1	2983	45.2
1990	1698.7	487	40.1	54.5	40.1	54.5	39.9	39.5	3486	39.9
1991	2953.4	625	75.0	63.1	75.0	63.1	54.1	45.6	6791	77.7
1992	2910.4	510	63.6	63.2	63.5	63.2	64.1	50.4	6156	69.1
1993	4449.6	582	87.4	68.7	87.1	68.5	87.4	58.7	7802	89.3
1994	4296.6	605	81.7	71.1	81.4	71.0	81.3	62.9	7716	88.3
1995	3584.2	605	67.7	70.6	67.7	70.4	67.4	63.7	5937	67.6
1996	4518.0	605	85.7	72.7	85.6	72.5	85.0	66.6	7691	87.6
1997	4441.7	605	83.9	74.0	83.6	73.9	83.6	68.7	7644	87.0
1998	3892.3	605	73.5	74.0	73.5	73.8	73.2	69.1	7108	80.9
1999	5000.1	605	94.4	75.9	94.4	75.8	94.1	71.6	8369	95.3
2000	4757.3	605	89.5	77.1	88.6	77.0	89.5	73.2	8153	92.8
2001	4291.2	605	81.0	77.5	80.9	77.3	80.7	73.8	7301	83.1
2002	4627.8	605	87.5	78.2	87.5	78.1	87.3	74.8	7965	90.9
2003	4583.3	605	86.6	78.8	86.6	78.7	86.5	75.6	7856	89.7
2004	1942.7	605	36.9	76.1	36.9	75.9	36.6	73.1	3385	38.5
2005	2322.9	605	43.9	74.1	43.9	74.0	43.8	71.3	4829	55.1
2006	2378.9	605	45.9	72.5	45.9	72.4	45.5	69.8	4291	49.0
2007	3295.8	595	63.1	72.0	63.1	71.9	63.2	69.4	5680	64.8
2008	0.0	595	0.0	68.3	0.0	68.2	0.0	65.9	0	0.0
2009	3946.0	595	76.0	68.7	76.0	68.6	75.7	66.4	6986	79.7
2010	4407.4	595	84.2	69.4	84.2	69.3	84.6	67.2	7547	86.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		600			1056	
B. Refuelling without a maintenance	600			22	7	
C. Inspection, maintenance or repair combined with refuelling				466	21	
D. Inspection, maintenance or repair without refuelling				758		
E. Testing of plant systems or components					17	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				45		
H. Nuclear regulatory requirements				229	190	
J. Grid limitation, failure or grid unavailability					3	2
Z. Others				28	69	
Subtotal	600	600	0	1548	1363	2
Total		1200			2913	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		414
12. Reactor I&C Systems		20
13. Reactor Auxiliary Systems		42
16. Steam generation systems		197
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities	264	14
31. Turbine and auxiliaries		47
32. Feedwater and Main Steam System		65
33. Circulating Water System		78
41. Main Generator Systems	336	138
42. Electrical Power Supply Systems		33
Total	600	1050

GB-19B HARTLEPOOL-A2

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 595.0 MW(e)
Design Net Capacity: 600.0 MW(e)
Design Discharge Burnup: 24000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3738.1 GW(e).h
Energy Availability Factor: 71.7%
Load Factor: 71.7%
Operating Factor: 76.2%
Energy Unavailability Factor: 28.3%
Total Off-line Time: 2086 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	413.7	397.7	439.7	392.3	0.0	299.0	433.8	432.4	419.0	274.4	111.9	124.1	3738.1
EAF (%)	93.3	99.4	99.5	91.6	0.0	69.8	98.0	97.7	97.8	61.8	26.1	28.0	71.7
UCF (%)	93.3	99.4	99.5	91.6	0.0	69.8	98.0	97.7	97.8	61.8	26.1	28.0	71.7
LF (%)	93.5	99.5	99.3	91.6	0.0	69.8	98.0	97.7	97.8	62.0	26.1	28.0	71.7
OF (%)	100.0	100.0	100.0	98.1	0.0	77.5	100.0	100.0	100.0	63.6	31.3	46.2	76.2
EUUF (%)	6.7	0.6	0.5	8.4	100.0	30.2	2.0	2.3	2.2	38.2	73.9	72.0	28.3
PUF (%)	0.4	0.5	0.5	8.4	35.8	1.3	1.3	1.3	1.3	1.3	44.4	1.3	8.2
UCLF (%)	6.3	0.1	0.0	0.0	64.2	28.9	0.7	1.0	0.8	36.8	29.5	70.6	20.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1968
Date of First Criticality: 09 Sep 1984
Date of Grid Connection: 31/10/1984
Date of Commercial Operation: 04 Jan 1989

Lifetime Generation: 76334.0 GW(e).h
Cumulative Energy Availability Factor: 70.9%
Cumulative Load Factor: 69.3%
Cumulative Unit Capability Factor: 71.1%
Cumulative Energy Unavailability Factor: 29.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	2234.8	421	100.0	100.0	100.0	100.0	80.6	80.6	4689	71.0
1990	3238.4	487	74.1	84.3	74.1	84.3	76.0	77.8	6796	77.8
1991	1855.9	625	55.1	71.6	55.1	71.6	34.0	58.7	3755	43.0
1992	4316.8	571	87.3	76.1	87.0	76.0	84.9	66.3	7923	89.0
1993	4264.6	582	84.9	78.1	83.8	77.8	83.8	70.2	7682	87.9
1994	3703.9	605	70.2	76.6	69.9	76.3	70.1	70.2	6612	75.7
1995	3750.7	605	70.9	75.7	70.9	75.4	70.6	70.2	6149	70.0
1996	4370.3	605	82.2	76.6	82.1	76.3	82.2	71.9	8131	92.6
1997	4127.9	605	77.9	76.8	77.2	76.4	77.7	72.6	6954	79.2
1998	4555.1	605	86.0	77.7	85.6	77.4	85.7	74.0	7973	90.8
1999	4472.5	605	84.4	78.4	83.6	78.0	84.2	75.0	7808	88.9
2000	4265.9	605	80.3	78.6	80.3	78.2	80.3	75.5	7463	85.0
2001	4635.9	605	87.5	79.3	87.5	79.0	87.2	76.4	8092	92.1
2002	4910.3	605	92.7	80.3	92.7	80.0	92.7	77.6	8383	95.7
2003	3488.4	605	66.4	79.3	66.4	79.1	65.8	76.8	6258	71.4
2004	3380.6	605	64.0	78.3	64.0	78.1	63.6	76.0	6016	68.5
2005	3651.6	605	69.2	77.8	69.2	77.5	68.9	75.5	6428	73.4
2006	2481.1	605	47.8	76.1	47.8	75.8	47.4	73.9	4455	50.9
2007	3593.6	595	69.1	75.7	69.1	75.5	68.9	73.6	6514	74.4
2008	0.0	595	0.0	71.8	0.0	71.6	0.0	69.9	0	0.0
2009	2882.1	595	56.0	71.0	56.0	70.9	55.3	69.2	5360	61.2
2010	3738.1	595	71.7	71.1	71.7	70.9	71.7	69.3	6674	76.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1488			953	
B. Refuelling without a maintenance	552			10	4	
C. Inspection, maintenance or repair combined with refuelling				601	31	
D. Inspection, maintenance or repair without refuelling				535		
E. Testing of plant systems or components					5	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				42		
H. Nuclear regulatory requirements				97		49
L. Human factor related		48				
Z. Others				71	7	
Subtotal	552	1536	0	1356	1000	49
Total		2088			2405	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		477
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems	120	2
15. Reactor Cooling Systems		52
16. Steam generation systems	1008	9
21. Fuel Handling and Storage Facilities		2
31. Turbine and auxiliaries		21
32. Feedwater and Main Steam System	72	152
33. Circulating Water System		77
41. Main Generator Systems		112
42. Electrical Power Supply Systems	288	15
Total	1488	936

GB-20A HEYSHAM-A1

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 585.0 MW(e)
Design Net Capacity: 611.0 MW(e)
Design Discharge Burnup: 24000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2826.7 GW(e).h
Energy Availability Factor: 55.1%
Load Factor: 55.2%
Operating Factor: 58.4%
Energy Unavailability Factor: 44.9%
Total Off-line Time: 3643 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	364.2	394.4	424.0	404.5	429.6	30.2	0.0	0.0	0.0	400.7	79.8	299.2	2826.7
EAF (%)	83.4	99.9	97.4	96.0	98.7	7.2	0.0	0.0	0.0	91.9	18.9	68.7	55.1
UCF (%)	83.4	99.9	97.4	96.0	98.7	7.2	0.0	0.0	0.0	91.9	18.9	68.7	55.1
LF (%)	83.7	100.3	97.4	96.0	98.7	7.2	0.0	0.0	0.0	92.1	18.9	68.7	55.2
OF (%)	90.3	100.0	100.0	100.0	100.0	7.6	0.0	0.0	0.0	99.9	19.9	83.9	58.4
EUUF (%)	16.6	0.1	2.6	4.0	1.3	92.8	100.0	100.0	100.0	8.1	81.1	31.3	44.9
PUF (%)	6.2	0.1	0.4	1.8	1.3	90.3	86.4	29.4	4.6	0.9	3.0	2.4	19.0
UCLF (%)	10.5	0.0	2.2	2.2	0.0	2.5	13.6	70.6	95.4	7.2	78.0	28.9	25.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 12 Jan 1970 **Lifetime Generation:** 79570.0 GW(e).h
Date of First Criticality: 04 Jun 1983 **Cumulative Energy Availability Factor:** 69.8%
Date of Grid Connection: 07 Sep 1983 **Cumulative Load Factor:** 68.8%
Date of Commercial Operation: 04 Jan 1989 **Cumulative Unit Capability Factor:** 70.1%
Cumulative Energy Unavailability Factor: 30.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	2351.6	420	100.0	100.0	100.0	100.0	84.8	84.8	5448	82.5
1990	1786.7	487	43.4	65.7	43.4	65.7	42.0	58.9	4096	46.9
1991	3826.2	621	86.4	74.7	86.4	74.7	70.5	63.9	7279	83.3
1992	2764.2	550	55.8	69.4	55.6	69.3	56.4	61.8	5981	67.2
1993	3638.2	555	75.0	70.6	74.3	70.4	75.0	64.7	6643	76.0
1994	4563.4	575	90.5	74.3	90.4	74.1	90.8	69.5	8128	93.0
1995	2808.9	575	55.9	71.4	55.9	71.3	55.6	67.4	4794	54.6
1996	4056.8	575	80.3	72.6	80.2	72.5	80.3	69.1	7674	87.4
1997	4298.8	575	85.4	74.1	84.5	73.9	85.1	71.0	7757	88.3
1998	3766.1	575	74.8	74.2	73.8	73.9	74.6	71.4	6950	79.1
1999	4549.8	575	90.4	75.8	89.7	75.4	90.1	73.2	7990	91.0
2000	4587.9	575	90.8	77.1	90.4	76.7	90.8	74.7	8230	93.7
2001	4034.6	575	78.0	77.2	77.6	76.8	79.9	75.2	6959	79.2
2002	4445.5	575	88.4	78.0	87.9	77.6	88.3	76.1	7921	90.4
2003	3746.2	575	74.8	77.8	74.4	77.4	74.4	76.0	6783	77.4
2004	2638.1	575	52.8	76.2	52.5	75.8	52.2	74.5	4951	56.4
2005	4033.1	575	80.1	76.4	80.1	76.1	80.1	74.8	7458	85.1
2006	3839.1	575	75.5	76.3	75.5	76.0	75.2	74.8	7229	82.5
2007	2498.5	585	49.1	74.8	49.1	74.5	48.8	73.4	4892	55.8
2008	0.0	585	0.0	70.9	0.0	70.6	0.0	69.5	0	0.0
2009	3478.3	585	68.4	70.8	68.4	70.5	67.9	69.5	6363	72.6
2010	2826.7	585	55.1	70.1	55.1	69.8	55.2	68.8	5117	58.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		816			806	
B. Refuelling without a maintenance				34	2	
C. Inspection, maintenance or repair combined with refuelling	1272			709	47	
D. Inspection, maintenance or repair without refuelling	192			537		
E. Testing of plant systems or components					70	26
H. Nuclear regulatory requirements				85	53	15
J. Grid limitation, failure or grid unavailability					6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						7
L. Human factor related		1368				
Z. Others		24		68	36	
Subtotal	1464	2208	0	1433	1020	48
Total		3672			2501	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		432
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems	744	2
15. Reactor Cooling Systems		50
16. Steam generation systems		33
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System		21
33. Circulating Water System	72	127
41. Main Generator Systems		90
42. Electrical Power Supply Systems		29
XX. Miscellaneous Systems		7
Total	816	801

GB-20B HEYSHAM-A2

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP)
at the beginning of 2010: 575.0 MW(e)
Design Net Capacity: 611.0 MW(e)
Design Discharge Burnup: 24000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2421.7 GW(e).h
Energy Availability Factor: 48.1%
Load Factor: 48.1%
Operating Factor: 66.9%
Energy Unavailability Factor: 51.9%
Total Off-line Time: 2898 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	321.1	290.4	320.4	60.6	267.9	70.4	181.0	300.5	293.0	305.5	3.1	7.9	2421.7
EAF (%)	75.1	75.2	75.0	14.6	62.6	17.0	42.3	70.2	70.8	71.3	0.8	1.8	48.1
UCF (%)	75.1	75.2	75.0	14.6	62.6	17.0	42.3	70.2	70.8	71.3	0.8	1.9	48.1
LF (%)	75.1	75.2	74.9	14.6	62.6	17.0	42.3	70.2	70.8	71.4	0.8	1.8	48.1
OF (%)	100.0	100.0	100.0	20.0	87.2	24.0	64.4	100.0	100.0	100.0	1.5	5.1	66.9
EUUF (%)	24.9	24.8	25.0	85.4	37.4	83.0	57.7	29.8	29.2	28.7	99.2	98.2	51.9
PUF (%)	0.0	0.0	0.0	60.8	8.1	1.7	2.0	1.4	1.0	0.4	0.1	0.0	6.2
UCLF (%)	24.9	24.9	25.0	24.5	29.2	81.3	55.7	28.4	28.3	28.3	99.2	98.2	45.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 12 Jan 1970 **Lifetime Generation:** 72650.0 GW(e).h
Date of First Criticality: 06 Mar 1984 **Cumulative Energy Availability Factor:** 67.3%
Date of Grid Connection: 10 Nov 1984 **Cumulative Load Factor:** 66.3%
Date of Commercial Operation: 04 Jan 1989 **Cumulative Unit Capability Factor:** 67.9%
Cumulative Energy Unavailability Factor: 32.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	2505.6	470	100.0	100.0	100.0	100.0	90.4	90.4	5507	83.4
1990	3044.2	487	72.0	83.0	72.0	83.0	71.5	78.9	6690	76.6
1991	2647.7	622	65.0	75.2	64.6	75.0	48.7	65.8	5132	58.7
1992	3548.1	550	74.6	75.0	72.8	74.4	72.5	67.7	6951	78.1
1993	4336.5	555	88.5	77.9	88.1	77.4	89.4	72.4	7886	90.3
1994	3707.5	575	75.3	77.5	72.8	76.5	73.8	72.7	6652	76.1
1995	3367.5	575	66.9	75.8	66.9	75.0	66.7	71.7	5772	65.7
1996	3561.9	575	70.8	75.1	70.5	74.4	70.5	71.6	6836	77.8
1997	4443.3	575	88.2	76.7	86.9	75.9	88.0	73.5	8026	91.4
1998	4497.6	575	89.3	78.0	86.7	77.1	89.0	75.2	7999	91.1
1999	3712.7	575	73.8	77.6	71.7	76.5	73.5	75.0	6570	74.8
2000	4342.6	575	86.3	78.4	86.1	77.4	86.0	76.0	7946	90.5
2001	4495.0	575	90.8	79.4	89.3	78.3	89.0	77.0	8187	93.2
2002	3407.9	575	68.3	78.6	68.1	77.6	67.7	76.3	6313	72.1
2003	3647.0	575	72.5	78.1	72.5	77.2	72.4	76.1	6595	75.3
2004	1974.6	575	39.9	75.7	39.7	74.8	39.1	73.7	3805	43.3
2005	2112.6	575	43.7	73.7	43.7	72.9	41.9	71.7	3869	44.2
2006	3972.3	575	79.0	74.0	79.0	73.3	78.9	72.1	7735	88.3
2007	2981.6	575	59.4	73.2	59.4	72.5	59.2	71.4	6280	71.7
2008	0.0	575	0.0	69.4	0.0	68.8	0.0	67.7	0	0.0
2009	2865.5	575	57.2	68.8	57.2	68.2	56.9	67.2	6414	73.2
2010	2421.7	575	48.1	67.9	48.1	67.3	48.1	66.3	5862	66.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		2236			593	
B. Refuelling without a maintenance	648			37	2	
C. Inspection, maintenance or repair combined with refuelling				656	22	
D. Inspection, maintenance or repair without refuelling				563	276	
E. Testing of plant systems or components				7	19	5
H. Nuclear regulatory requirements				58	72	56
J. Grid limitation, failure or grid unavailability					2	10
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				52	5	6
L. Human factor related		24				
Z. Others				48	60	
Subtotal	648	2260	0	1421	1051	77
Total		2908			2549	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		214
12. Reactor I&C Systems	48	5
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		56
16. Steam generation systems		10
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		100
32. Feedwater and Main Steam System		30
33. Circulating Water System		122
41. Main Generator Systems	816	10
42. Electrical Power Supply Systems	1372	39
Total	2236	587

GB-22A HEYSHAM-B1

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 620.0 MW(e)
Design Net Capacity: 615.0 MW(e)
Design Discharge Burnup: 27000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5000.0 GW(e).h
Energy Availability Factor: 92.8%
Load Factor: 92.1%
Operating Factor: 98.6%
Energy Unavailability Factor: 7.2%
Total Off-line Time: 123 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	419.5	410.9	403.6	439.4	426.5	397.1	446.4	416.5	434.2	429.9	322.7	453.5	5000.0
EAF (%)	91.8	99.4	88.4	99.2	93.3	89.8	97.6	91.1	98.1	93.9	73.1	98.3	92.8
UCF (%)	91.8	99.4	88.4	99.2	93.3	89.8	97.6	91.1	98.1	93.9	93.0	98.3	94.4
LF (%)	90.9	98.6	87.5	98.4	92.5	89.0	96.8	90.3	97.3	93.2	72.3	98.3	92.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.9	100.0	98.6
EUUF (%)	8.2	0.6	11.6	0.8	6.7	10.2	2.4	8.9	1.9	6.1	26.9	1.7	7.2
PUF (%)	6.2	0.0	7.0	0.0	5.3	6.3	0.2	6.8	0.9	5.4	5.1	1.5	3.8
UCLF (%)	2.1	0.6	4.6	0.8	1.5	3.9	2.2	2.1	1.0	0.8	2.0	0.2	1.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	0.0	1.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1980
Date of First Criticality: 23/06/1988
Date of Grid Connection: 07 Dec 1988
Date of Commercial Operation: 04 Jan 1989

Lifetime Generation: 89089.0 GW(e).h
Cumulative Energy Availability Factor: 77.5%
Cumulative Load Factor: 76.1%
Cumulative Unit Capability Factor: 78.2%
Cumulative Energy Unavailability Factor: 22.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	900.8	615	56.9	56.9	56.9	56.9	22.2	22.2	2319	35.1
1990	1487.0	615	27.7	40.3	27.7	40.3	27.7	25.3	3509	40.2
1991	1465.4	615	36.9	39.1	36.9	39.1	27.3	26.0	2786	31.9
1992	4096.0	615	80.2	50.2	74.8	48.7	74.8	39.2	7240	81.3
1993	4498.2	622	83.7	57.3	82.3	55.8	82.7	48.4	7376	84.4
1994	4181.1	625	79.1	61.1	75.6	59.3	76.6	53.3	7255	83.0
1995	5193.8	625	94.9	66.2	94.5	64.6	94.6	59.5	8286	94.3
1996	4707.4	625	85.7	68.7	85.0	67.2	85.7	62.9	7699	87.6
1997	4152.8	625	75.9	69.5	75.2	68.1	75.6	64.4	7105	80.9
1998	5019.4	625	91.7	71.8	90.5	70.4	91.4	67.2	8688	98.9
1999	4235.5	625	77.4	72.3	76.6	71.0	77.1	68.1	7212	82.1
2000	4415.3	625	80.4	73.0	79.9	71.8	80.4	69.2	7502	85.4
2001	5241.0	625	92.0	74.5	91.5	73.3	95.5	71.2	8534	97.2
2002	4414.0	625	80.8	75.0	80.8	73.9	80.6	71.9	7501	85.6
2003	5045.3	625	92.2	76.2	92.0	75.1	92.2	73.3	8444	96.4
2004	4115.7	625	75.4	76.1	75.3	75.1	75.0	73.4	7250	82.5
2005	4262.5	625	78.0	76.2	78.0	75.3	77.9	73.7	7317	83.5
2006	4604.0	625	85.2	76.7	85.2	75.9	85.1	74.3	8057	92.0
2007	4617.3	615	85.8	77.2	85.8	76.4	85.7	74.9	8006	91.4
2008	3879.3	615	72.1	76.9	72.1	76.2	71.8	74.8	7038	80.1
2009	4750.2	620	87.8	77.5	87.7	76.7	87.6	75.4	8497	97.0
2010	5000.0	620	94.4	78.2	92.8	77.5	92.1	76.1	8637	98.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				14	261	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling				678	34	
D. Inspection, maintenance or repair without refuelling				43		
E. Testing of plant systems or components				1	6	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				136		
H. Nuclear regulatory requirements				98		
J. Grid limitation, failure or grid unavailability						42
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						3
L. Human factor related					30	
Z. Others			240			
Subtotal	0	0	240	970	335	45
Total		240			1350	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
15. Reactor Cooling Systems		6
31. Turbine and auxiliaries		119
32. Feedwater and Main Steam System		124
41. Main Generator Systems		17
42. Electrical Power Supply Systems		2
Total	0	268

GB-22B HEYSHAM-B2

Operator: BE (BRITISH ENERGY)
Contractor: NPC (NUCLEAR POWER CO. LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 620.0 MW(e)
Design Net Capacity: 615.0 MW(e)
Design Discharge Burnup: 27000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1437.4 GW(e).h
Energy Availability Factor: 27.2%
Load Factor: 26.5%
Operating Factor: 31.0%
Energy Unavailability Factor: 72.8%
Total Off-line Time: 6041 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	337.0	351.4	363.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	385.3	1437.4
EAF (%)	73.9	85.1	79.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	83.9	27.2
UCF (%)	73.9	85.2	79.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	83.9	27.2
LF (%)	73.1	84.3	78.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.5	26.5
OF (%)	100.0	100.0	81.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.3	31.0
EUUF (%)	26.1	14.9	20.2	99.2	99.2	99.2	99.2	99.2	99.2	99.3	99.2	16.1	72.8
PUF (%)	6.4	0.0	17.9	98.3	71.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2
UCLF (%)	19.8	14.9	2.3	0.9	27.8	99.2	99.2	99.2	99.2	99.3	99.2	16.1	56.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 08 Jan 1980 **Lifetime Generation:** 83307.0 GW(e).h
Date of First Criticality: 11 Jan 1988 **Cumulative Energy Availability Factor:** 73.9%
Date of Grid Connection: 11 Nov 1988 **Cumulative Load Factor:** 72.5%
Date of Commercial Operation: 04 Jan 1989 **Cumulative Unit Capability Factor:** 75.0%
Cumulative Energy Unavailability Factor: 26.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	2590.4	615	74.4	74.4	74.4	74.4	63.8	63.8	4878	73.9
1990	784.0	615	14.9	40.5	14.9	40.5	14.6	35.8	1901	21.8
1991	2424.0	615	53.7	45.3	53.4	45.2	45.1	39.2	4453	51.0
1992	3486.5	615	66.4	51.0	64.7	50.5	63.7	45.8	6198	69.6
1993	4384.9	622	91.6	59.6	79.6	56.6	80.6	53.1	7125	81.6
1994	4435.3	625	84.0	63.9	80.7	60.9	81.2	58.1	7723	88.4
1995	4498.8	625	82.2	66.6	82.3	64.1	81.9	61.6	7249	82.5
1996	4265.4	625	78.6	68.2	78.4	65.9	77.7	63.7	7103	80.9
1997	4780.7	625	87.4	70.4	85.5	68.2	87.1	66.4	8021	91.3
1998	4209.7	625	77.0	71.1	76.2	69.0	76.7	67.5	7574	86.2
1999	2987.2	625	54.7	69.5	54.6	67.7	54.4	66.3	4987	56.8
2000	5001.9	625	91.1	71.4	90.5	69.6	91.1	68.4	8660	98.6
2001	4234.2	625	91.4	73.0	90.8	71.3	77.1	69.1	7103	80.9
2002	5010.3	625	91.5	74.3	91.5	72.8	91.5	70.7	8521	97.3
2003	4582.8	625	83.9	75.0	83.8	73.5	83.7	71.6	7712	88.0
2004	4244.2	625	77.5	75.1	77.5	73.8	77.3	72.0	7383	84.1
2005	5056.8	625	92.3	76.1	92.3	74.9	92.4	73.2	8564	97.8
2006	4816.7	625	89.1	76.9	89.1	75.7	89.0	74.1	8293	94.7
2007	4046.7	615	74.9	76.8	74.9	75.6	75.1	74.1	7104	81.1
2008	4709.3	620	86.7	77.3	86.7	76.2	86.6	74.8	8252	93.9
2009	4012.1	620	76.8	77.2	74.2	76.1	73.9	74.7	7268	83.0
2010	1437.4	620	27.2	75.0	27.2	73.9	26.5	72.5	2719	31.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		4644		13	419	
B. Refuelling without a maintenance				11	13	
C. Inspection, maintenance or repair combined with refuelling	1380			653	46	
D. Inspection, maintenance or repair without refuelling				50		
E. Testing of plant systems or components					9	
G. Major back-fitting, refurbishment or upgrading activities without refuelling				22		
H. Nuclear regulatory requirements				244		
J. Grid limitation, failure or grid unavailability					7	40
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						50
P. Fire					2	
Subtotal	1380	4644	0	993	496	90
Total		6024			1579	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		8
16. Steam generation systems	96	
31. Turbine and auxiliaries	216	300
32. Feedwater and Main Steam System		34
33. Circulating Water System	4332	
41. Main Generator Systems		90
Total	4644	432

GB-16A HINKLEY POINT-B1

Operator: BE (BRITISH ENERGY)
 Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 410.0 MW(e)
 Design Net Capacity: 625.0 MW(e)
 Design Discharge Burnup: 27000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3152.4 GW(e).h
 Energy Availability Factor: 81.8%
 Load Factor: 87.8%
 Operating Factor: 84.6%
 Energy Unavailability Factor: 18.2%
 Total Off-line Time: 1349 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	67.3	251.5	317.1	320.1	311.6	310.7	13.9	315.9	312.9	307.8	293.1	330.4	3152.4
EAF (%)	20.7	83.7	95.9	100.0	94.7	99.4	4.5	97.9	100.0	94.6	92.4	99.8	81.8
UCF (%)	20.7	83.7	95.9	100.0	94.7	99.4	4.5	97.9	100.0	94.6	92.4	100.0	81.8
LF (%)	22.1	91.3	104.0	108.4	102.2	105.3	4.6	103.6	106.0	100.9	99.3	108.3	87.8
OF (%)	22.6	88.4	100.0	100.0	100.0	100.0	6.6	100.0	100.0	100.0	100.0	100.0	84.6
EUf (%)	79.3	16.3	4.1	0.0	5.3	0.6	95.5	2.1	0.0	5.4	7.6	0.2	18.2
PUF (%)	0.1	0.0	4.1	0.0	5.0	0.1	0.5	0.1	0.0	4.8	5.9	0.0	1.7
UCLF (%)	79.1	16.3	0.0	0.0	0.3	0.5	94.9	2.1	0.0	0.5	1.7	0.0	16.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Jan 1967
 Date of First Criticality: 24/09/1976
 Date of Grid Connection: 30/10/1976
 Date of Commercial Operation: 10 Feb 1978
 Lifetime Generation: 114475.0 GW(e).h
 Cumulative Energy Availability Factor: 74.9%
 Cumulative Load Factor: 76.0%
 Cumulative Unit Capability Factor: 75.6%
 Cumulative Energy Unavailability Factor: 25.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978			Data not provided							
1979	3079.8	400	79.4	79.4	73.5	73.5	88.1	88.1	6646	76.1
1980	2337.2	475	59.9	68.8	55.4	63.6	56.3	70.9	5394	61.7
1981	3441.6	520	78.5	72.5	74.3	67.7	74.3	72.2	7118	79.9
1982	2950.8	520	67.8	71.2	65.4	67.0	65.0	70.2	6000	68.7
1983	4083.0	520	88.3	74.8	86.6	71.2	89.9	74.4	8127	93.0
1984	3408.2	520	72.0	74.3	71.6	71.3	75.0	74.5	6589	75.4
1985	4263.0	520	82.3	75.5	82.2	72.9	93.8	77.4	8167	93.5
1986	3199.2	560	68.2	74.5	67.2	72.1	65.4	75.7	6110	69.9
1987	1838.0	560	39.6	70.2	38.8	68.0	36.9	70.9	3554	39.9
1988	2905.4	560	59.9	69.1	59.1	67.0	59.4	69.7	5370	61.5
1989	4195.3	560	85.6	70.7	85.5	68.8	85.8	71.2	7878	90.2
1990	3102.0	560	63.9	70.1	63.4	68.3	63.4	70.6	5732	65.6
1991	4601.9	560	94.3	72.1	94.3	70.5	94.1	72.5	8430	96.5
1992	3614.5	583	70.2	71.9	69.8	70.4	69.5	72.2	6565	73.7
1993	4843.3	585	94.8	73.6	94.6	72.2	94.0	73.8	8587	97.5
1994	4126.2	585	78.7	73.9	78.3	72.6	80.7	74.3	7342	84.0
1995	4812.5	610	90.1	75.0	89.6	73.7	89.8	75.3	7910	90.1
1996	4797.3	610	90.2	76.0	89.7	74.7	89.5	76.2	8418	95.8
1997	4185.7	610	78.4	76.1	78.3	74.9	78.1	76.3	7341	83.6
1998	4252.6	610	79.6	76.3	80.9	75.3	79.4	76.5	7740	88.1
1999	4045.2	610	75.8	76.3	77.0	75.4	75.5	76.4	7221	82.2
2000	3850.6	610	71.9	76.1	71.9	75.2	71.9	76.2	7208	82.1
2001	4802.0	610	87.0	76.6	87.0	75.7	89.6	76.9	8545	97.3
2002	4581.0	610	85.0	77.0	85.0	76.2	85.7	77.3	8021	91.6
2003	4076.4	610	74.8	76.9	74.8	76.1	76.3	77.2	7032	80.3
2004	4578.7	610	84.8	77.2	84.8	76.5	85.5	77.6	8091	92.1
2005	4580.6	610	85.2	77.5	85.2	76.8	85.7	77.9	8257	94.3
2006	3370.2	610	62.4	76.9	62.4	76.3	62.3	77.3	6200	70.8
2007	1877.4	430	45.2	76.0	45.2	75.4	44.9	76.3	5204	59.4
2008	2628.8	410	72.8	75.9	72.8	75.3	72.1	76.2	6935	79.0
2009	1931.5	410	55.4	75.4	53.7	74.8	53.8	75.7	4963	56.7
2010	3152.4	410	81.8	75.6	81.8	74.9	87.8	76.0	7411	84.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1344		13	477	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				174	28	
D. Inspection, maintenance or repair without refuelling				348		
E. Testing of plant systems or components					1	
H. Nuclear regulatory requirements				134	3	
J. Grid limitation, failure or grid unavailability						
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						1
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant, spare part delivery problems etc.)						4
Subtotal	0	1344	0	669	511	5
Total		1344			1185	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1978 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		12
12. Reactor I&C Systems		12
15. Reactor Cooling Systems		3
16. Steam generation systems		149
31. Turbine and auxiliaries	912	127
32. Feedwater and Main Steam System		20
41. Main Generator Systems	432	78
42. Electrical Power Supply Systems		80
Total	1344	481

GB-16B HINKLEY POINT-B2

Operator: BE (BRITISH ENERGY)

Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUF at the beginning of 2010): 430.0 MW(e)
 Design Net Capacity: 625.0 MW(e)
 Design Discharge Burnup: 27000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3263.2 GW(e).h
 Energy Availability Factor: 84.8%
 Load Factor: 86.6%
 Operating Factor: 87.8%
 Energy Unavailability Factor: 15.2%
 Total Off-line Time: 1067 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	258.0	0.0	284.5	300.5	331.6	298.7	322.4	305.8	295.5	260.3	315.2	290.8	3263.2
EAF (%)	78.6	0.0	85.5	93.2	99.9	95.8	99.1	95.0	95.0	80.5	99.5	88.5	84.8
UCF (%)	78.6	0.0	85.5	93.2	99.9	95.8	99.1	95.0	95.0	80.5	99.5	88.7	84.8
LF (%)	80.6	0.0	88.9	97.1	103.7	96.5	100.8	95.6	95.5	81.4	101.8	90.9	86.6
OF (%)	82.3	0.0	88.3	100.0	100.0	100.0	100.0	100.0	97.4	89.8	100.0	89.1	87.8
EUf (%)	21.4	100.0	14.5	6.8	0.1	4.2	0.9	5.0	5.0	19.5	0.5	11.5	15.2
PUF (%)	6.7	81.0	0.0	6.1	0.0	3.9	0.5	5.0	0.0	5.9	0.0	0.0	8.6
UCLF (%)	14.7	19.0	14.5	0.7	0.1	0.3	0.4	0.0	5.0	13.6	0.5	11.2	6.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 09 Jan 1967
 Date of First Criticality: 02 Jan 1976
 Date of Grid Connection: 02 May 1976
 Date of Commercial Operation: 27/09/1976

Lifetime Generation: 111223.0 GW(e).h
 Cumulative Energy Availability Factor: 73.1%
 Cumulative Load Factor: 72.0%
 Cumulative Unit Capability Factor: 74.3%
 Cumulative Energy Unavailability Factor: 26.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976			Data not provided							
1977	1044.0	400	74.6	74.6	74.6	74.6	29.9	29.9	2756	31.5
1978			Data not provided							
1979	1499.7	400	44.0	59.3	38.2	56.4	42.9	36.4	3512	40.2
1980	3008.9	475	71.3	63.8	69.3	61.2	72.5	49.9	6390	73.1
1981	2488.8	520	57.1	61.8	54.7	59.3	53.8	51.0	5054	56.8
1982	3155.1	520	73.6	64.5	69.8	61.6	69.5	55.1	6834	78.2
1983	3454.5	520	75.6	66.5	74.1	63.9	76.0	58.9	6839	78.3
1984	4393.5	520	89.6	70.1	89.4	67.8	96.7	64.8	8228	94.2
1985	3229.9	520	66.7	69.6	66.7	67.7	71.1	65.6	5950	68.1
1986	3497.3	560	81.2	71.1	75.1	68.6	72.5	66.5	7257	84.2
1987	2971.1	560	68.3	70.7	60.6	67.7	59.6	65.7	6333	71.1
1988	4268.2	560	91.1	72.8	86.6	69.6	87.2	67.9	8467	96.9
1989	2484.6	560	65.6	72.1	65.3	69.2	50.8	66.3	4896	56.0
1990	4463.5	560	92.4	73.8	91.2	71.1	91.2	68.4	8565	98.0
1991	2353.5	560	57.4	72.6	57.4	70.0	48.1	66.8	4432	50.7
1992	3902.0	583	76.6	72.9	76.3	70.5	75.1	67.4	7225	81.1
1993	3743.0	597	71.7	72.8	71.4	70.5	71.7	67.8	6575	75.3
1994	4852.2	610	91.5	74.0	91.1	71.9	91.1	69.3	8602	98.5
1995	4518.1	610	84.6	74.7	84.6	72.7	84.3	70.3	7411	84.4
1996	3119.9	610	58.9	73.8	59.1	71.9	58.2	69.6	5615	63.9
1997	4512.9	610	84.5	74.4	85.0	72.7	84.2	70.4	7958	90.6
1998	4738.9	610	88.7	75.1	88.3	73.5	88.4	71.3	8641	98.4
1999	4082.3	610	76.9	75.2	75.8	73.6	76.2	71.6	7402	84.3
2000	4189.4	610	78.9	75.4	78.9	73.9	78.2	71.9	7851	89.4
2001	4772.4	610	84.1	75.8	84.1	74.3	89.1	72.7	8406	95.7
2002	3257.3	610	61.2	75.2	61.2	73.8	61.0	72.2	6163	70.4
2003	4619.5	610	86.5	75.6	86.5	74.3	86.4	72.8	8575	97.9
2004	4150.5	610	77.7	75.7	77.7	74.4	77.5	73.0	8163	92.9
2005	3357.2	610	63.3	75.2	63.3	74.0	62.8	72.6	6544	74.7
2006	3132.9	610	61.5	74.7	59.8	73.5	59.4	72.1	6051	69.1
2007	1812.9	430	44.0	73.9	44.0	72.7	43.9	71.3	4806	54.9
2008	2709.9	410	74.1	73.9	74.1	72.7	74.3	71.4	6821	77.7
2009	3016.3	430	79.6	74.0	79.6	72.9	81.0	71.6	7268	83.0
2010	3263.2	430	84.8	74.3	84.8	73.1	86.6	72.0	7693	87.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		528		7	685	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				157	16	
D. Inspection, maintenance or repair without refuelling	600			137		
E. Testing of plant systems or components				3	10	
H. Nuclear regulatory requirements				38	60	
J. Grid limitation, failure or grid unavailability					2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					4	
Z. Others					11	
Subtotal	600	528	0	342	790	0
Total		1128			1132	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories	216	29
12. Reactor I&C Systems		15
15. Reactor Cooling Systems		11
16. Steam generation systems	96	262
21. Fuel Handling and Storage Facilities	96	
31. Turbine and auxiliaries		147
32. Feedwater and Main Steam System		131
33. Circulating Water System		1
41. Main Generator Systems	120	61
42. Electrical Power Supply Systems		12
XX. Miscellaneous Systems		3
Total	528	672

GB-17A HUNTERSTON-B1

Operator: BE (BRITISH ENERGY)

Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUF at the beginning of 2010): 430.0 MW(e)
 Design Net Capacity: 624.0 MW(e)
 Design Discharge Burnup: 21000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3635.5 GW(e).h
 Energy Availability Factor: 90.5%
 Load Factor: 96.5%
 Operating Factor: 96.0%
 Energy Unavailability Factor: 9.5%
 Total Off-line Time: 351 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	312.2	314.8	329.0	339.8	155.3	334.1	288.1	318.2	294.4	341.9	298.5	309.1	3635.5
EAF (%)	92.2	100.0	94.5	100.0	46.4	99.9	85.1	95.7	90.8	100.0	92.0	91.2	90.5
UCF (%)	92.2	100.0	94.5	100.0	46.4	100.0	85.1	95.7	90.8	100.0	92.0	91.2	90.5
LF (%)	97.6	109.0	102.8	109.8	48.5	107.9	90.1	99.5	95.1	106.9	96.4	96.6	96.5
OF (%)	100.0	100.0	100.0	100.0	57.8	100.0	97.3	98.9	100.0	100.0	98.8	100.0	96.0
EUF (%)	7.8	0.0	5.5	0.0	53.6	0.1	14.9	4.3	9.2	0.0	8.0	8.8	9.5
PUF (%)	5.7	0.0	4.2	0.0	6.4	0.0	5.7	0.0	5.3	0.0	3.1	6.2	3.1
UCLF (%)	2.1	0.0	1.2	0.0	47.2	0.0	9.1	4.3	4.0	0.0	5.0	2.6	6.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 11 Jan 1967
 Date of First Criticality: 31/01/1976
 Date of Grid Connection: 02 Jun 1976
 Date of Commercial Operation: 02 Jun 1976

Lifetime Generation: 114448.0 GW(e).h
 Cumulative Energy Availability Factor: 70.6%
 Cumulative Load Factor: 69.2%
 Cumulative Unit Capability Factor: 70.9%
 Cumulative Energy Unavailability Factor: 29.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	1349.0	459	36.0	36.0	36.0	36.0	35.7	35.7	4293	52.2
1977	1709.2	500	40.1	38.2	40.1	38.2	39.1	37.5	4313	49.4
1978	2158.4	500	49.4	42.1	49.4	42.1	49.4	41.7	5375	61.5
1979	2250.0	500	52.2	44.7	52.2	44.7	51.5	44.2	5259	60.2
1980	1486.0	500	34.4	42.6	34.4	42.6	34.0	42.1	3750	42.9
1981	1794.8	500	40.8	42.3	40.8	42.3	40.3	41.8	3941	44.3
1982	3484.1	515	77.3	47.5	77.3	47.5	77.4	47.1	7408	84.8
1983	2912.0	520	63.1	49.5	63.1	49.5	64.1	49.3	6107	69.9
1984	4214.0	550	85.5	53.9	85.5	53.9	87.7	54.0	8080	92.5
1985	3644.2	575	71.1	55.8	71.1	55.8	72.5	56.1	6655	76.2
1986	4571.2	575	89.1	59.2	89.1	59.2	91.0	59.6	8268	94.6
1987	3268.4	575	63.7	59.6	63.7	59.6	63.8	60.0	6358	71.4
1988	4492.3	575	89.2	62.1	89.2	62.1	89.4	62.5	8568	98.1
1989	2959.7	575	58.2	61.8	58.2	61.8	58.9	62.2	5467	62.6
1990	4744.1	575	92.7	64.0	92.7	64.0	94.4	64.5	8585	98.3
1991	2033.8	575	40.1	62.4	40.1	62.4	40.5	62.9	3827	43.8
1992	4315.7	575	92.0	64.3	84.4	63.8	84.3	64.3	8771	98.5
1993	2928.9	575	59.5	64.0	58.2	63.5	58.3	63.9	5581	63.9
1994	4698.1	582	92.8	65.7	92.4	65.1	92.3	65.5	8545	97.8
1995	3830.0	585	74.2	66.1	74.2	65.6	72.5	65.9	6917	76.6
1996	1643.7	585	98.5	67.8	98.5	67.3	32.0	64.2	2839	32.3
1997	3834.0	595	73.6	68.1	73.6	67.6	73.4	64.6	7035	80.1
1998	4835.4	595	92.8	69.3	92.8	68.8	92.5	66.0	8584	97.7
1999	4811.5	595	92.3	70.3	92.3	69.9	92.1	67.1	8591	97.8
2000	4035.6	595	77.2	70.6	77.2	70.2	77.2	67.6	7497	85.3
2001	5030.4	595	86.6	71.3	86.6	70.9	96.2	68.7	8598	97.9
2002	4678.5	595	89.1	72.0	89.1	71.6	89.8	69.6	8356	95.4
2003	3936.5	595	74.7	72.1	74.6	71.7	75.5	69.8	7225	82.5
2004	4522.7	595	85.8	72.6	85.6	72.2	86.5	70.4	8271	94.2
2005	4096.4	595	78.8	72.8	78.4	72.4	78.6	70.7	8207	93.7
2006	1991.4	595	37.8	71.6	37.8	71.2	37.5	69.6	3838	43.8
2007	1303.3	420	32.5	70.5	32.5	70.2	31.9	68.6	4315	49.3
2008	2213.4	410	60.9	70.3	60.9	70.0	61.1	68.4	5894	67.1
2009	2828.0	430	73.9	70.4	73.9	70.1	75.9	68.6	6969	79.6
2010	3635.5	430	90.5	70.9	90.5	70.6	96.5	69.2	8409	96.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		336			533	4
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				353	6	
D. Inspection, maintenance or repair without refuelling				733	13	
E. Testing of plant systems or components				75	7	
H. Nuclear regulatory requirements				30		
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	11	
Subtotal	0	336	0	1193	572	5
Total		336			1770	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1976 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		21
13. Reactor Auxiliary Systems		5
14. Safety Systems		1
15. Reactor Cooling Systems		60
16. Steam generation systems		236
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries	336	81
32. Feedwater and Main Steam System		42
33. Circulating Water System		5
35. All other I&C Systems		2
41. Main Generator Systems		40
42. Electrical Power Supply Systems		29
XX. Miscellaneous Systems		4
Total	336	527

GB-17B HUNTERSTON-B2

Operator: BE (BRITISH ENERGY)
 Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 430.0 MW(e)
 Design Net Capacity: 624.0 MW(e)
 Design Discharge Burnup: 21000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3218.7 GW(e).h
 Energy Availability Factor: 85.1%
 Load Factor: 85.4%
 Operating Factor: 89.9%
 Energy Unavailability Factor: 14.9%
 Total Off-line Time: 884 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	292.1	274.1	318.9	292.9	316.2	281.9	294.2	0.0	242.3	293.7	307.0	305.4	3218.7
EAF (%)	90.8	94.3	98.7	93.6	98.7	91.1	92.0	0.0	78.2	91.5	99.1	94.6	85.1
UCF (%)	90.8	94.4	98.9	93.6	98.7	91.1	92.1	0.0	78.3	91.7	99.1	94.6	85.1
LF (%)	91.3	94.8	99.7	94.6	98.8	91.1	92.0	0.0	78.2	91.8	99.2	95.5	85.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	96.0	0.0	84.7	100.0	100.0	100.0	89.9
EUF (%)	9.2	5.7	1.3	6.4	1.3	8.9	8.0	100.0	21.8	8.5	0.9	5.4	14.9
PUF (%)	5.8	4.2	0.9	4.9	0.0	4.9	6.0	97.9	20.8	4.8	0.0	4.2	13.0
UCLF (%)	3.4	1.4	0.2	1.5	1.3	4.0	1.9	2.1	0.9	3.6	0.9	1.2	1.9
XUF (%)	0.0	0.2	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jan 1967
 Date of First Criticality: 27/03/1977
 Date of Grid Connection: 31/03/1977
 Date of Commercial Operation: 31/03/1977
 Lifetime Generation: 109201.0 GW(e).h
 Cumulative Energy Availability Factor: 71.2%
 Cumulative Load Factor: 68.8%
 Cumulative Unit Capability Factor: 71.3%
 Cumulative Energy Unavailability Factor: 28.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	1047.7	500	29.2	29.2	29.2	29.2	28.4	28.4	3071	41.7
1978	0.0	500	0.0	13.4	0.0	13.4	0.0	13.0	0	0.0
1979	0.0	500	0.0	8.7	0.0	8.7	0.0	8.4	0	0.0
1980	2544.0	500	58.9	21.7	58.9	21.7	58.2	21.4	5147	58.9
1981	3019.9	500	68.2	31.5	68.2	31.5	67.8	31.1	7219	81.1
1982	2706.2	515	59.8	36.4	59.8	36.4	60.1	36.2	5596	64.0
1983	4153.0	520	88.4	44.2	88.4	44.2	91.4	44.5	8524	97.6
1984	3287.0	550	67.7	47.4	67.7	47.4	68.4	47.7	6365	72.9
1985	4507.7	575	88.7	52.6	88.7	52.6	89.7	53.0	8303	95.0
1986	3616.1	575	70.8	54.6	70.8	54.6	72.0	55.1	6496	74.4
1987	4623.4	575	90.8	58.3	90.5	58.3	90.3	58.7	8710	97.8
1988	3115.5	575	61.3	58.6	61.3	58.5	62.0	59.0	5754	65.9
1989	4728.0	575	93.5	61.5	93.5	61.5	94.1	61.9	8643	98.9
1990	3231.3	575	63.8	61.7	63.8	61.6	64.3	62.1	5858	67.1
1991	4727.8	575	94.7	64.0	94.0	64.0	94.1	64.4	8707	99.7
1992	1969.7	575	39.2	62.3	39.2	62.3	38.5	62.6	3733	41.9
1993	4322.1	575	86.7	63.9	86.1	63.8	86.0	64.1	8128	93.0
1994	3784.7	582	74.9	64.5	74.7	64.4	74.4	64.7	6949	79.5
1995	4671.3	585	90.1	66.0	90.1	65.9	87.9	66.1	8315	91.6
1996	1276.6	585	91.9	67.4	91.9	67.3	24.8	63.9	2377	27.1
1997	4559.7	595	87.5	68.4	87.5	68.3	87.2	65.1	8200	93.4
1998	4518.0	595	86.7	69.3	86.7	69.2	86.4	66.1	8149	92.8
1999	4102.0	595	78.8	69.8	78.8	69.7	78.5	66.7	7302	83.1
2000	3241.6	595	62.0	69.4	62.0	69.3	62.0	66.5	6411	73.0
2001	3785.0	595	83.7	70.0	83.7	70.0	72.4	66.7	6485	73.8
2002	4413.1	595	83.1	70.6	83.1	70.5	84.7	67.5	7721	88.1
2003	4627.3	595	87.8	71.2	87.5	71.2	88.8	68.3	8381	95.7
2004	4238.7	595	83.7	71.7	83.5	71.6	81.1	68.8	7799	88.8
2005	3633.6	595	70.0	71.7	69.4	71.6	69.7	68.8	7017	80.1
2006	3746.0	595	71.0	71.6	71.0	71.5	71.0	68.9	6753	77.1
2007	1658.4	420	41.3	70.8	41.3	70.7	40.7	68.1	4642	53.0
2008	2240.7	410	61.9	70.6	61.9	70.5	61.8	68.0	6054	68.9
2009	3217.6	430	85.4	71.0	85.4	70.9	86.4	68.4	8065	92.1
2010	3218.7	430	85.1	71.3	85.1	71.2	85.4	68.8	7876	89.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		864		81	922	4
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling	864			233	21	
D. Inspection, maintenance or repair without refuelling				603		
E. Testing of plant systems or components				0	2	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				1	1	0
Subtotal	864	864	0	918	952	4
Total		1728			1874	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1977 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		7
14. Safety Systems		0
15. Reactor Cooling Systems		32
16. Steam generation systems		126
31. Turbine and auxiliaries		58
32. Feedwater and Main Steam System		719
33. Circulating Water System		4
35. All other I&C Systems		1
41. Main Generator Systems		11
42. Electrical Power Supply Systems		16
XX. Miscellaneous Systems	864	0
Total	864	978

GB-11A OLDBURY-A1

Operator: MEL (Magnox Electric Limited)
 Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 217.0 MW(e)
 Design Net Capacity: 300.0 MW(e)
 Design Discharge Burnup: 5430 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1728.4 GW(e).h
 Energy Availability Factor: 90.9%
 Load Factor: 90.9%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 9.1%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	145.3	133.9	147.5	133.0	146.6	144.3	147.9	147.9	140.5	147.7	145.1	148.7	1728.4
EAF (%)	90.0	91.8	91.4	85.1	90.8	92.4	91.6	91.6	89.9	91.5	92.9	92.1	90.9
UCF (%)	90.0	91.8	91.4	85.1	90.8	92.4	91.6	91.6	89.9	91.5	92.9	92.1	90.9
LF (%)	90.0	91.8	91.4	85.1	90.8	92.4	91.6	91.6	89.9	91.5	92.9	92.1	90.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	10.0	8.2	8.6	14.9	9.2	7.6	8.4	8.4	10.1	8.5	7.1	7.9	9.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	10.0	8.2	8.6	14.9	9.2	7.6	8.4	8.4	10.1	8.5	7.1	7.9	9.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING 2010 THERE WERE NO UNPLANNED REACTOR OUTAGES. THE REACTOR WAS ON LINE FOR THE WHOLE YEAR. THERE WAS A BOILER LEAK REPAIR IN APRIL AND TURBINE OVERSPEED TESTS IN OCTOBER.

5. Historical Summary

Date of Construction Start: 05 Jan 1962
 Date of First Criticality: 08 Jan 1967
 Date of Grid Connection: 11 Jul 1967
 Date of Commercial Operation: 31/12/1967
 Lifetime Generation: 60696.0 GW(e).h
 Cumulative Energy Availability Factor: 76.1%
 Cumulative Load Factor: 76.3%
 Cumulative Unit Capability Factor: 76.4%
 Cumulative Energy Unavailability Factor: 23.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1967			Data not provided							
1968			"							
1969			"							
1970	1273.0	212	100.0	100.0	100.0	100.0	68.5	68.5	0	0.0
1971	1560.5	212	86.9	93.4	86.9	93.4	83.6	76.1	8759	99.4
1972	1436.5	210	76.0	87.7	76.0	87.7	78.3	76.8	8736	100.0
1973	1265.2	200	63.3	81.8	63.3	81.8	72.4	75.8	8704	99.6
1974	1355.0	200	74.9	80.5	74.9	80.5	77.6	76.1	8731	99.9
1975	1436.5	204	78.9	80.2	78.9	80.2	80.6	76.8	8693	99.5
1976	1508.5	208	80.2	80.2	80.2	80.2	81.5	77.5	8714	97.9
1977	1555.0	208	85.5	80.9	85.5	80.9	85.6	78.5	8736	100.0
1978	1533.5	208	84.5	81.3	84.5	81.3	84.4	79.2	8736	100.0
1979	1592.0	208	88.1	82.0	88.1	82.0	87.6	80.0	8736	100.0
1980	1648.0	208	86.2	82.4	86.2	82.4	90.7	81.0	8736	100.0
1981	1688.0	208	85.5	82.6	85.5	82.6	91.1	81.9	8904	100.0
1982	1717.0	208	86.0	82.9	86.0	82.9	94.5	82.8	8736	100.0
1983	1506.5	217	77.4	82.5	77.4	82.5	79.5	82.6	8566	98.1
1984	1520.5	217	77.7	82.1	77.7	82.1	80.2	82.4	8736	100.0
1985	1661.1	217	83.2	82.2	83.2	82.2	87.6	82.8	8701	99.6
1986	1654.3	217	87.0	82.5	85.0	82.4	87.3	83.0	8650	99.0
1987	1611.5	217	84.1	82.6	82.9	82.4	83.4	83.0	8904	100.0
1988	1687.6	217	90.8	83.0	85.9	82.6	89.0	83.4	8530	97.6
1989	1457.6	217	86.5	83.2	82.0	82.6	76.9	83.0	8644	98.9
1990	1457.5	217	76.1	82.9	76.1	82.3	76.9	82.7	8713	99.7
1991	1592.1	217	84.3	82.9	84.3	82.4	84.0	82.8	8736	100.0
1992	1706.1	217	88.6	83.2	88.6	82.6	88.3	83.0	8857	99.5
1993	1770.6	217	92.9	83.6	92.5	83.1	93.4	83.5	8736	100.0
1994	1743.4	217	91.6	83.9	91.6	83.4	92.0	83.8	8318	95.2
1995	1570.5	217	82.6	83.9	82.6	83.4	82.6	83.8	7861	89.7
1996	1548.8	217	81.3	83.8	81.3	83.3	81.3	83.7	7870	89.6
1997	1693.1	217	89.1	84.0	89.1	83.5	89.1	83.9	8722	99.6
1998	1532.3	217	80.6	83.9	80.6	83.4	80.6	83.8	7617	87.0
1999	1774.3	217	93.2	84.2	93.2	83.7	93.3	84.1	8420	96.1
2000	1641.4	217	86.1	84.2	86.1	83.8	86.1	84.2	7928	90.3
2001	1621.3	217	85.3	84.3	85.3	83.9	85.3	84.2	7668	87.5
2002	1715.0	217	90.1	84.5	90.1	84.1	90.2	84.4	8215	93.8
2003	1513.7	217	79.6	84.3	79.6	83.9	79.6	84.2	7438	84.9
2004	723.8	217	38.0	83.0	38.0	82.6	38.0	82.9	3430	39.0
2005	744.6	217	39.2	81.7	39.2	81.4	39.2	81.7	3997	45.6
2006	1106.0	217	58.2	81.1	58.2	80.7	58.2	81.0	5628	64.2
2007	0.0	217	0.0	78.9	0.0	78.6	0.0	78.9	0	0.0
2008	0.0	217	0.0	76.9	0.0	76.5	0.0	76.8	0	0.0
2009	842.3	217	44.3	76.0	44.3	75.7	44.3	76.0	4739	54.1
2010	1728.4	217	90.9	76.4	90.9	76.1	90.9	76.3	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				1	337	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				27		
D. Inspection, maintenance or repair without refuelling				1254		
E. Testing of plant systems or components				114		0
H. Nuclear regulatory requirements				30	6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						4
Subtotal	0	0	0	1426	345	4
Total		0			1775	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		15
12. Reactor I&C Systems		10
14. Safety Systems		0
15. Reactor Cooling Systems		31
16. Steam generation systems		16
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities		9
31. Turbine and auxiliaries		43
32. Feedwater and Main Steam System		9
35. All other I&C Systems		1
41. Main Generator Systems		142
42. Electrical Power Supply Systems		50
Total	0	328

GB-11B OLDBURY-A2

Operator: MEL (Magnox Electric Limited)
Contractor: TNPG (THE NUCLEAR POWER GROUP LTD.)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 217.0 MW(e)
Design Net Capacity: 300.0 MW(e)
Design Discharge Burnup: 5470 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1371.9 GW(e).h
Energy Availability Factor: 72.2%
Load Factor: 72.2%
Operating Factor: 75.1%
Energy Unavailability Factor: 27.8%
Total Off-line Time: 2181 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	149.1	137.5	153.5	148.7	152.5	151.4	158.3	160.8	14.1	91.7	54.1	0.0	1371.9
EAF (%)	92.4	94.3	95.1	95.2	94.5	96.9	98.1	99.6	9.0	56.8	34.6	0.0	72.2
UCF (%)	92.4	94.3	95.1	95.2	94.5	96.9	98.1	99.6	9.0	56.8	34.6	0.0	72.2
LF (%)	92.4	94.3	95.1	95.2	94.5	96.9	98.1	99.6	9.0	56.8	34.6	0.0	72.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	9.4	57.8	34.6	0.0	75.1
EUF (%)	7.6	5.7	4.9	4.8	5.5	3.1	1.9	0.4	91.0	43.2	65.4	100.0	27.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.6	41.7	0.0	0.0	11.0
UCLF (%)	7.6	5.7	4.9	4.8	5.5	3.1	1.9	0.4	0.4	1.5	65.4	100.0	16.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING 2010 THERE WAS A PLANNED GRAPHITE INSPECTION OUTAGE COMMENCING ON 03 SEPTEMBER OF ABOUT 41 DAYS, AND THE REACTOR RETURNED TO SERVICE ON 14 OCTOBER. THERE WAS AN AUTOMATIC UNPLANNED TRIP ON 11 NOVEMBER DUE TO A GAS CIRCULATOR TURBINE TRIP. WHEN AN UNPLANNED TRIP SUCH AS THIS ONE OCCURRED THERE IS A REQUIREMENT UNDER THE GRAPHITE SAFETY CASE TO CARRY OUT CHANNEL VIEWING ON ABOUT 130 CHANNELS. THIS TOOK THE REST OF THIS CALENDAR YEAR.

5. Historical Summary

Date of Construction Start: 05 Jan 1962
Date of First Criticality: 12 Jan 1967
Date of Grid Connection: 04 Jun 1968
Date of Commercial Operation: 30/09/1968

Lifetime Generation: 65002.0 GW(e).h
Cumulative Energy Availability Factor: 80.9%
Cumulative Load Factor: 81.5%
Cumulative Unit Capability Factor: 81.2%
Cumulative Energy Unavailability Factor: 19.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1968			Data not provided							
1969			"							
1970	1273.0	212	100.0	100.0	100.0	100.0	68.5	68.5	0	0.0
1971	1560.5	212	86.9	93.4	86.9	93.4	83.6	76.1	8759	99.4
1972	1436.5	210	76.0	87.7	76.0	87.7	78.3	76.8	8736	100.0
1973	1265.2	200	63.3	81.8	63.3	81.8	72.4	75.8	8704	99.6
1974	1355.0	200	74.9	80.5	74.9	80.5	77.6	76.1	8731	99.9
1975	1436.5	204	78.9	80.2	78.9	80.2	80.6	76.8	8693	99.5
1976	1508.5	208	80.2	80.2	80.2	80.2	81.5	77.5	8714	97.9
1977	1555.0	208	85.5	80.9	85.5	80.9	85.6	78.5	8736	100.0
1978	1533.5	208	84.5	81.3	84.5	81.3	84.4	79.2	8736	100.0
1979	1592.0	208	88.1	82.0	88.1	82.0	87.6	80.0	8736	100.0
1980	1648.0	208	86.2	82.4	86.2	82.4	90.7	81.0	8736	100.0
1981	1688.0	208	85.5	82.6	85.5	82.6	91.1	81.9	8904	100.0
1982	1717.0	208	86.0	82.9	86.0	82.9	94.5	82.8	8736	100.0
1983	1506.5	217	77.4	82.5	77.4	82.5	79.5	82.6	8566	98.1
1984	1520.5	217	77.7	82.1	77.7	82.1	80.2	82.4	8736	100.0
1985	1661.1	217	83.2	82.2	83.2	82.2	87.6	82.8	8701	99.6
1986	1654.3	217	87.0	82.5	85.0	82.4	87.3	83.0	8650	99.0
1987	1611.5	217	84.1	82.6	82.9	82.4	83.4	83.0	8904	100.0
1988	1687.6	217	90.8	83.0	85.9	82.6	89.0	83.4	8530	97.6
1989	1457.6	217	86.5	83.2	82.0	82.6	76.9	83.0	8644	98.9
1990	1457.5	217	76.1	82.9	76.1	82.3	76.9	82.7	8713	99.7
1991	1592.1	217	84.3	82.9	84.3	82.4	84.0	82.8	8736	100.0
1992	1706.1	217	88.6	83.2	88.6	82.6	88.3	83.0	8857	99.5
1993	1770.6	217	92.9	83.6	92.5	83.1	93.4	83.5	8736	100.0
1994	1743.4	217	91.6	83.9	91.6	83.4	92.0	83.8	8318	95.2
1995	1841.3	217	96.7	84.4	96.7	83.9	96.9	84.3	8613	98.3
1996	1790.9	217	94.0	84.8	94.0	84.3	94.0	84.7	8641	98.4
1997	1832.4	217	96.4	85.2	96.4	84.7	96.4	85.1	8618	98.4
1998	1883.1	217	98.8	85.7	98.8	85.2	99.1	85.6	8760	100.0
1999	1515.5	217	79.3	85.5	79.3	85.0	79.7	85.4	7036	80.3
2000	1951.6	217	98.6	85.9	98.6	85.5	102.4	86.0	8685	98.9
2001	1939.8	217	98.8	86.3	98.8	85.9	102.0	86.5	8715	99.5
2002	1705.7	217	87.8	86.4	87.8	86.0	89.7	86.6	7724	88.2
2003	1859.4	217	93.4	86.6	93.4	86.2	97.8	86.9	8187	93.5
2004	1686.4	217	88.5	86.6	88.5	86.3	88.5	87.0	8187	93.2
2005	776.5	217	40.9	85.3	40.9	85.0	40.9	85.7	3743	42.7
2006	0.0	217	0.0	83.0	0.0	82.6	0.0	83.3	0	0.0
2007	618.0	217	32.5	81.7	32.5	81.3	32.5	82.0	3178	36.3
2008	1660.1	217	87.2	81.8	87.2	81.5	87.1	82.1	8241	93.8
2009	1265.1	217	66.6	81.4	66.6	81.1	66.6	81.7	6439	73.5
2010	1371.9	217	72.2	81.2	72.2	80.9	72.2	81.5	6579	75.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1215			173	1
D. Inspection, maintenance or repair without refuelling	966			897		
H. Nuclear regulatory requirements				67		
Subtotal	966	1215	0	964	173	1
Total		2181			1138	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1972 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		18
12. Reactor I&C Systems		10
15. Reactor Cooling Systems		3
16. Steam generation systems	1215	4
17. Safety I&C Systems (excluding reactor I&C)		10
21. Fuel Handling and Storage Facilities		24
31. Turbine and auxiliaries		59
32. Feedwater and Main Steam System		3
33. Circulating Water System		6
41. Main Generator Systems		2
42. Electrical Power Supply Systems		28
Total	1215	167

GB-24 SIZEWELL-B

Operator: BE (BRITISH ENERGY)
Contractor: PPC (PWR POWER PROJECTS Ltd)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP)
at the beginning of 2010: 1188.0 MW(e)
Design Net Capacity: 1188.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4774.8 GW(e).h
Energy Availability Factor: 45.6%
Load Factor: 45.9%
Operating Factor: 46.0%
Energy Unavailability Factor: 54.4%
Total Off-line Time: 4728 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	885.7	804.3	458.6	0.0	0.0	0.0	0.0	0.0	0.0	871.2	862.6	892.4	4774.8
EAF (%)	99.4	100.0	52.2	0.0	0.0	0.0	0.0	0.0	0.4	98.2	100.0	100.0	45.6
UCF (%)	99.4	100.0	52.2	0.0	0.0	0.0	0.0	0.0	0.4	98.2	100.0	100.0	45.6
LF (%)	100.2	100.7	51.9	0.0	0.0	0.0	0.0	0.0	0.0	98.6	100.8	101.0	45.9
OF (%)	100.0	100.0	52.4	0.0	0.0	0.0	0.0	0.0	2.5	100.0	100.0	100.0	46.0
EUUF (%)	0.6	0.0	47.8	100.0	100.0	100.0	100.0	100.0	99.6	1.8	0.0	0.0	54.4
PUF (%)	0.6	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.0	0.1
UCLF (%)	0.0	0.1	47.8	100.0	100.0	99.9	99.7	99.7	99.4	1.8	0.0	0.0	54.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 18/07/1988 **Lifetime Generation:** 109913.0 GW(e).h
Date of First Criticality: 31/01/1995 **Cumulative Energy Availability Factor:** 83.8%
Date of Grid Connection: 14/02/1995 **Cumulative Load Factor:** 82.1%
Date of Commercial Operation: 22/09/1995 **Cumulative Unit Capability Factor:** 83.9%
Cumulative Energy Unavailability Factor: 16.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1995	0.0	1188	100.0	100.0	99.6	99.6	0.0	0.0	0	0.0
1996	8488.5	1188	81.3	86.0	81.4	85.9	81.3	61.0	7367	83.9
1997	8469.8	1188	81.4	84.0	81.5	84.0	81.2	69.6	6992	79.6
1998	10123.1	1188	97.3	88.0	97.4	88.0	97.0	77.9	8705	99.1
1999	7959.0	1188	76.5	85.4	76.5	85.4	76.3	77.5	7134	81.2
2000	8527.2	1188	81.7	84.7	81.6	84.7	81.7	78.3	7612	86.7
2001	9198.0	1188	77.4	83.5	77.2	83.5	88.1	79.8	7784	88.6
2002	9195.0	1188	88.9	84.3	88.5	84.2	88.4	81.0	7862	89.7
2003	8854.2	1188	89.3	84.9	88.7	84.7	85.1	81.5	7613	86.9
2004	9329.1	1188	89.4	85.4	89.4	85.2	89.4	82.3	8685	98.9
2005	8696.3	1188	83.9	85.2	83.9	85.1	83.6	82.5	7476	85.3
2006	8908.3	1188	85.2	85.2	85.2	85.1	85.2	82.7	7570	86.4
2007	10264.3	1188	98.5	86.3	98.5	86.2	98.5	84.0	8760	100.0
2008	9301.2	1188	89.2	86.5	89.2	86.4	89.1	84.4	8097	92.2
2009	9094.9	1188	87.3	86.6	87.3	86.5	87.4	84.6	7863	89.8
2010	4774.8	1188	45.6	83.9	45.6	83.8	45.9	82.1	4032	46.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1995 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		4728			213	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				412	66	
E. Testing of plant systems or components					4	
H. Nuclear regulatory requirements				237		
Subtotal	0	4728	0	649	285	0
Total		4728			934	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1995 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		25
13. Reactor Auxiliary Systems		3
14. Safety Systems		54
15. Reactor Cooling Systems	4728	5
16. Steam generation systems		3
31. Turbine and auxiliaries		3
32. Feedwater and Main Steam System		20
41. Main Generator Systems		96
XX. Miscellaneous Systems		0
Total	4728	209

GB-23A TORNESS 1

Operator: BE (BRITISH ENERGY)

Contractor: NNC (NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 600.0 MW(e)
 Design Net Capacity: 645.0 MW(e)
 Design Discharge Burnup: 29500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 2565.4 GW(e).h
 Energy Availability Factor: 48.8%
 Load Factor: 48.8%
 Operating Factor: 60.5%
 Energy Unavailability Factor: 51.2%
 Total Off-line Time: 3458 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	421.1	9.4	129.8	300.0	255.5	324.1	335.4	416.1	41.7	0.0	9.1	323.1	2565.4
EAF (%)	94.3	2.3	29.2	69.4	57.2	75.0	75.1	93.2	9.7	0.0	2.1	72.4	48.8
UCF (%)	94.3	2.3	29.2	69.4	57.2	75.0	75.1	93.2	9.7	0.0	2.1	72.4	48.8
LF (%)	94.3	2.3	29.1	69.4	57.2	75.0	75.1	93.2	9.7	0.0	2.1	72.4	48.8
OF (%)	100.0	2.4	38.6	100.0	78.9	100.0	100.0	100.0	10.0	0.0	6.9	83.1	60.5
EUf (%)	5.7	97.7	70.8	30.6	42.8	25.0	24.9	6.8	90.3	100.0	97.9	27.6	51.2
PUF (%)	5.4	0.6	0.5	0.5	0.5	1.8	6.3	0.4	89.0	77.1	0.2	0.1	15.2
UCLF (%)	0.3	97.1	70.3	30.1	42.3	23.2	18.6	6.4	1.4	22.9	97.7	27.5	35.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 08 Jan 1980 Lifetime Generation: 82237.0 GW(e).h
 Date of First Criticality: 25/03/1988 Cumulative Energy Availability Factor: 73.1%
 Date of Grid Connection: 25/05/1988 Cumulative Load Factor: 69.1%
 Date of Commercial Operation: 25/05/1988 Cumulative Unit Capability Factor: 74.9%
 Cumulative Energy Unavailability Factor: 26.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	2287.1	638	92.5	92.5	69.1	69.1	66.2	66.2	4330	80.9
1989	2162.1	625	53.2	68.5	39.5	51.0	39.6	49.9	4582	52.4
1990	1938.4	625	35.7	56.0	35.7	45.1	35.5	44.4	3943	45.1
1991	2513.6	625	46.0	53.2	46.0	45.4	46.0	44.9	5011	57.4
1992	4532.9	632	81.7	59.5	81.7	53.4	80.6	52.8	7792	87.5
1993	3603.1	632	67.9	61.1	67.7	56.0	62.9	54.6	6358	70.2
1994	4329.9	632	86.7	64.9	79.5	59.6	78.4	58.2	7716	88.3
1995	4058.6	632	75.2	66.3	75.2	61.6	71.5	60.0	6867	76.5
1996	1178.1	632	96.6	69.8	96.6	65.7	21.2	55.5	2043	23.3
1997	4909.4	625	89.7	71.9	89.7	68.2	89.4	59.0	8050	91.6
1998	4297.9	625	78.6	72.5	78.6	69.1	78.3	60.8	7153	81.4
1999	5157.8	625	94.2	74.3	94.2	71.3	93.9	63.6	8737	99.5
2000	4376.8	625	79.7	74.8	79.7	71.9	79.7	64.9	8769	99.8
2001	3968.5	625	70.2	74.4	70.2	71.8	72.3	65.4	7613	86.7
2002	3761.9	625	69.6	74.1	68.7	71.6	68.7	65.6	6719	76.7
2003	4681.9	625	85.8	74.8	85.6	72.5	85.5	66.9	8347	95.3
2004	3921.8	625	71.7	74.7	71.7	72.4	71.4	67.2	6993	79.6
2005	4667.7	625	85.3	75.3	85.3	73.2	85.3	68.2	8372	95.6
2006	4000.9	625	76.7	75.3	73.3	73.2	73.1	68.5	7939	90.6
2007	3500.9	625	65.3	74.8	64.2	72.7	63.9	68.2	6234	71.2
2008	4488.1	615	83.5	75.2	82.9	73.2	82.7	68.9	8110	92.3
2009	4963.6	600	93.9	76.1	93.9	74.1	93.9	70.0	8760	100.0
2010	2565.4	600	48.8	74.9	48.8	73.1	48.8	69.1	5302	60.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1368			253	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	1224			598	30	
D. Inspection, maintenance or repair without refuelling				166		
E. Testing of plant systems or components					1	
H. Nuclear regulatory requirements				51		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						26
L. Human factor related		840				
M. Governmental requirements or court decisions						14
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)		144				
Z. Others				3	28	
Subtotal	1224	2352	0	818	317	40
Total		3576			1175	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories	96	
12. Reactor I&C Systems		26
14. Safety Systems	144	
15. Reactor Cooling Systems		75
16. Steam generation systems		6
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		9
41. Main Generator Systems		73
42. Electrical Power Supply Systems	1128	27
Total	1368	236

GB-23B TORNESS 2

Operator: BE (BRITISH ENERGY)
Contractor: NNC (NATIONAL NUCLEAR CORPORATION)

1. Station Details

Type: GCR
Net Reference Unit Power (RUP at the beginning of 2010): 605.0 MW(e)
Design Net Capacity: 645.0 MW(e)
Design Discharge Burnup: 29500 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4531.2 GW(e).h
Energy Availability Factor: 85.5%
Load Factor: 85.5%
Operating Factor: 95.3%
Energy Unavailability Factor: 14.5%
Total Off-line Time: 415 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	361.3	399.0	402.5	409.4	391.3	431.2	374.0	331.6	312.3	300.2	385.6	432.8	4531.2
EAF (%)	80.3	98.1	89.6	94.0	86.9	99.0	83.1	73.7	71.7	66.6	88.5	96.1	85.5
UCF (%)	80.3	98.1	89.6	94.0	86.9	99.0	83.1	73.7	91.5	66.6	88.5	96.2	87.1
LF (%)	80.3	98.1	89.4	94.0	86.9	99.0	83.1	73.7	71.7	66.7	88.5	96.1	85.5
OF (%)	92.3	100.0	100.0	100.0	98.8	100.0	100.0	100.0	76.8	75.5	100.0	100.0	95.3
EUUF (%)	19.7	1.9	10.4	6.0	13.1	1.0	16.9	26.3	28.3	33.4	11.5	3.9	14.5
PUF (%)	6.2	0.2	5.0	3.7	6.7	0.1	5.2	0.0	0.0	0.0	7.4	0.0	2.9
UCLF (%)	13.5	1.6	5.4	2.4	6.3	0.9	11.7	26.3	8.5	33.4	4.0	3.9	10.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.8	0.0	0.0	0.0	1.6

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1980 **Lifetime Generation:** 81462.0 GW(e).h
Date of First Criticality: 23/12/1988 **Cumulative Energy Availability Factor:** 74.0%
Date of Grid Connection: 02 Mar 1989 **Cumulative Load Factor:** 70.3%
Date of Commercial Operation: 02 Mar 1989 **Cumulative Unit Capability Factor:** 75.1%
Cumulative Energy Unavailability Factor: 26.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	3633.8	625	87.4	87.4	74.2	74.2	73.3	73.3	7068	89.1
1990	1948.3	625	36.1	60.5	36.1	54.2	35.7	53.6	4211	48.2
1991	2651.3	625	48.4	56.3	48.4	52.2	48.6	51.9	5068	58.0
1992	3732.7	625	67.0	59.1	67.0	56.1	67.1	55.8	6560	73.7
1993	4038.0	632	74.4	62.2	74.4	59.8	73.1	59.4	7168	82.1
1994	3478.1	632	71.2	63.8	65.5	60.8	62.8	59.9	6264	71.5
1995	4651.9	632	85.9	67.1	85.9	64.5	81.3	63.1	7909	87.4
1996	1571.3	632	96.2	70.8	96.2	68.5	28.3	58.7	2409	27.4
1997	4218.0	625	77.7	71.5	77.7	69.6	76.8	60.7	7181	81.8
1998	5094.4	625	93.7	73.8	93.7	72.0	92.8	64.0	8713	99.2
1999	4984.0	625	91.1	75.3	91.1	73.7	90.8	66.4	8588	97.8
2000	3936.1	625	71.7	75.0	71.7	73.6	71.7	66.8	7686	87.5
2001	4293.6	625	77.2	75.2	76.6	73.8	78.2	67.7	8476	96.5
2002	1945.6	625	37.0	72.5	35.7	71.1	35.5	65.4	3751	42.8
2003	3782.8	625	69.4	72.3	69.4	71.0	69.1	65.7	6874	78.5
2004	4083.0	625	74.6	72.4	74.6	71.2	74.4	66.2	7682	87.5
2005	4821.9	625	87.9	73.3	87.9	72.2	88.1	67.5	8570	97.8
2006	3297.0	625	64.4	72.8	60.5	71.5	60.2	67.1	6456	73.7
2007	4829.0	625	89.2	73.7	88.3	72.4	88.2	68.2	8480	96.8
2008	4780.8	615	88.4	74.4	88.2	73.2	88.1	69.2	8494	96.7
2009	4151.2	605	78.3	74.6	78.3	73.4	78.0	69.6	7303	83.4
2010	4531.2	605	87.1	75.1	85.5	74.0	85.5	70.3	8345	95.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		156			305	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling				621	40	
D. Inspection, maintenance or repair without refuelling				189		
G. Major back-fitting, refurbishment or upgrading activities without refuelling				20	21	
H. Nuclear regulatory requirements				43		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	
M. Governmental requirements or court decisions						16
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			168			
R. External restrictions on supply and services (lack of funds due to delayed payments from customers, disputes in fuel industries, fuel-rationing, labour strike outside the plant , spare part delivery problems etc.)				7		
Z. Others		192				
Subtotal	0	348	168	880	370	16
Total		516			1266	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems	156	2
15. Reactor Cooling Systems		238
16. Steam generation systems		26
17. Safety I&C Systems (excluding reactor I&C)		19
21. Fuel Handling and Storage Facilities		2
32. Feedwater and Main Steam System		6
42. Electrical Power Supply Systems		10
Total	156	303

GB-13A WYLFA 1

Operator: MEL (Magnox Electric Limited)

Contractor: EE/B&W/T (THE ENGLISH ELECTRIC CO. LTD / BABCOCK & WILCOX CO. / TAYLOR WOODROW CONSTRUCTIO

1. Station Details

Type:	GCR
Net Reference Unit Power (RUP) at the beginning of 2010:	490.0 MW(e)
Design Net Capacity:	550.0 MW(e)
Design Discharge Burnup:	54000 MW.d/t
Status at end of year:	Operational

2. Production Summary 2010

Net Energy Production:	3480.5 GW(e).h
Energy Availability Factor:	81.1%
Load Factor:	81.1%
Operating Factor:	100.0%
Energy Unavailability Factor:	18.9%
Total Off-line Time:	0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	293.0	276.6	238.8	275.4	243.9	308.5	319.2	296.6	300.4	277.5	314.3	336.3	3480.5
EAF (%)	80.4	84.0	65.5	78.1	66.9	87.4	87.6	81.4	85.1	76.1	89.1	92.3	81.1
UCF (%)	80.4	84.0	65.5	78.1	66.9	87.4	89.8	83.6	88.0	77.5	89.1	92.3	81.8
LF (%)	80.4	84.0	65.5	78.1	66.9	87.4	87.6	81.4	85.1	76.1	89.1	92.3	81.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	19.6	16.0	34.5	21.9	33.1	12.6	12.4	18.6	14.9	23.9	10.9	7.7	18.9
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	19.6	16.0	34.5	21.9	33.1	12.6	10.2	16.5	12.0	22.5	10.9	7.8	18.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.8	1.4	0.0	0.0	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING 2010 THERE WERE NO UNPLANNED REACTOR OUTAGES. THE REACTOR WAS ON LINE FOR THE WHOLE YEAR. THERE WERE SOME BOILER REPAIRS AND TURBINE LOSSES.

5. Historical Summary

Date of Construction Start:	09 Jan 1963	Lifetime Generation:	113053.0 GW(e).h
Date of First Criticality:	11 Jan 1969	Cumulative Energy Availability Factor:	71.0%
Date of Grid Connection:	24/01/1971	Cumulative Load Factor:	71.4%
Date of Commercial Operation:	11 Jan 1971	Cumulative Unit Capability Factor:	71.4%
		Cumulative Energy Unavailability Factor:	29.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	342.4	495	47.2	47.2	47.2	47.2	47.2	47.2	1273	87.0
1972	1513.2	495	35.0	36.7	35.0	36.7	35.0	36.7	0	0.0
1973	1118.5	420	33.1	35.2	30.5	34.1	30.5	34.1	0	0.0
1974	2182.0	420	59.5	42.4	59.5	41.6	59.5	41.6	8568	98.1
1975	791.5	420	21.6	37.6	21.6	37.0	21.6	37.0	4437	50.8
1976	2409.0	420	66.8	43.1	66.8	42.7	64.4	42.2	8633	97.0
1977	2492.0	420	73.5	47.9	70.0	46.9	67.9	46.2	8008	91.7
1978	1900.5	420	52.5	48.5	52.5	47.7	51.8	47.0	7739	88.6
1979	2600.0	420	74.9	51.7	74.9	50.9	70.9	49.8	8694	99.5
1980	2882.0	420	78.1	54.5	78.1	53.8	78.5	52.9	8609	98.5
1981	3117.0	420	83.2	57.3	83.2	56.7	83.3	55.9	8823	99.1
1982	3020.0	420	81.7	59.4	81.7	58.9	81.4	58.1	8700	98.5
1983	3148.0	420	83.9	61.4	83.9	60.9	85.8	60.4	8715	99.8
1984	3378.5	420	89.5	63.5	89.5	63.1	92.1	62.7	8728	99.9
1985	3341.3	420	88.5	65.2	88.4	64.8	91.1	64.7	8736	100.0
1986	2050.0	420	62.1	65.0	61.9	64.6	55.7	64.1	7939	90.6
1987	2249.7	420	59.1	64.7	58.8	64.3	60.2	63.9	8611	96.7
1988	3086.2	420	84.3	65.8	83.8	65.4	84.1	65.0	8530	97.6
1989	3307.0	420	86.9	66.9	86.9	66.6	89.6	66.4	8572	97.6
1990	3373.2	420	89.9	68.1	89.9	67.8	91.9	67.7	8549	97.9
1991	3725.7	420	91.5	69.3	89.7	68.8	101.5	69.3	8374	95.9
1992	3897.6	475	92.3	70.5	92.1	70.1	92.2	70.5	8904	100.0
1993	3607.6	475	87.0	71.3	86.8	70.9	86.9	71.4	8477	97.0
1994	3055.5	475	76.1	71.5	72.4	71.0	73.6	71.5	6933	79.4
1995	2928.8	475	69.7	71.5	69.7	70.9	70.4	71.4	6216	71.0
1996	3973.8	475	93.2	72.4	93.2	71.9	95.2	72.5	8438	96.1
1997	3534.8	490	81.9	72.8	81.9	72.3	82.3	72.9	7353	83.9
1998	3725.2	490	86.3	73.4	86.3	72.9	86.8	73.5	8079	92.2
1999	3130.3	490	72.7	73.3	72.7	72.9	72.9	73.4	7632	87.1
2000	1001.0	490	23.3	71.4	23.3	71.0	23.3	71.5	2460	28.0
2001	1306.5	490	30.4	69.9	30.4	69.5	30.4	70.0	3451	39.4
2002	4058.3	490	95.3	70.8	94.5	70.4	94.5	70.9	8541	97.5
2003	2916.0	490	68.2	70.7	67.9	70.3	67.9	70.8	6389	72.9
2004	4144.3	490	97.0	71.6	96.1	71.2	96.3	71.6	8784	100.0
2005	2967.9	490	69.7	71.6	69.1	71.1	69.1	71.5	7200	82.2
2006	3730.4	490	86.9	72.0	86.9	71.6	86.9	72.0	8598	98.2
2007	1569.9	490	36.6	71.0	36.6	70.5	36.6	71.0	4401	50.2
2008	3944.4	490	92.3	71.6	91.6	71.1	91.6	71.6	8784	100.0
2009	2343.0	490	54.9	71.1	54.6	70.7	54.6	71.1	5672	64.7
2010	3480.5	490	81.8	71.4	81.1	71.0	81.1	71.4	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					536	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				164	8	
D. Inspection, maintenance or repair without refuelling				814		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				90		
H. Nuclear regulatory requirements				16	8	
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	14
L. Human factor related					1	
Subtotal	0	0	0	1084	554	16
Total	0			1654		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1971 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			13
12. Reactor I&C Systems			30
13. Reactor Auxiliary Systems			0
14. Safety Systems			3
15. Reactor Cooling Systems			21
16. Steam generation systems			133
17. Safety I&C Systems (excluding reactor I&C)			1
21. Fuel Handling and Storage Facilities			31
31. Turbine and auxiliaries			117
32. Feedwater and Main Steam System			40
33. Circulating Water System			0
41. Main Generator Systems			0
42. Electrical Power Supply Systems			6
Total	0		395

GB-13B WYLFA 2

Operator: MEL (Magnox Electric Limited)

Contractor: EE/B&W/T (THE ENGLISH ELECTRIC CO. LTD / BABCOCK & WILCOX CO. / TAYLOR WOODROW CONSTRUCTION

1. Station Details

Type: GCR
 Net Reference Unit Power (RUP) at the beginning of 2010: 490.0 MW(e)
 Design Net Capacity: 550.0 MW(e)
 Design Discharge Burnup: 54000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 1584.6 GW(e).h
 Energy Availability Factor: 36.9%
 Load Factor: 36.9%
 Operating Factor: 48.3%
 Energy Unavailability Factor: 63.1%
 Total Off-line Time: 4525 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	303.8	292.9	252.9	62.3	0.0	0.0	0.0	0.0	0.0	149.8	262.1	260.8	1584.6
EAF (%)	83.3	89.0	69.4	17.7	0.0	0.0	0.0	0.0	0.0	41.1	74.3	71.5	36.9
UCF (%)	83.3	89.0	69.4	17.7	0.0	0.0	0.0	0.0	0.0	41.1	74.3	71.5	36.9
LF (%)	83.3	89.0	69.4	17.7	0.0	0.0	0.0	0.0	0.0	41.1	74.3	71.5	36.9
OF (%)	100.0	100.0	100.0	25.6	0.0	0.0	0.0	0.0	0.0	57.4	100.0	100.0	48.3
EUF (%)	16.7	11.0	30.6	82.3	100.0	100.0	100.0	100.0	100.0	58.9	25.7	28.5	63.1
PUF (%)	0.0	0.0	0.0	74.4	100.0	100.0	100.0	9.7	0.0	0.0	0.0	0.0	32.1
UCLF (%)	16.7	11.0	30.6	7.9	0.0	0.0	0.0	90.3	100.0	58.9	25.7	28.5	30.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

DURING 2010 THERE WAS ONE PLANNED STATUTORY OUTAGE COMMENCING ON 08 APRIL OF ABOUT 117 DAYS AND AN EXTENSION FOR REPAIRS OF ABOUT 68 DAYS. THERE WAS A MANUAL TRIP ON 11 OCTOBER OF ABOUT FOUR DAYS DURATION DUE TO ZONE ROD INDICATION FAULT. THERE WERE A SERIES OF BOILER LEAK REPAIRS.

5. Historical Summary

Date of Construction Start: 09 Jan 1963 Lifetime Generation: 105500.0 GW(e).h
 Date of First Criticality: 09 Jan 1970 Cumulative Energy Availability Factor: 69.6%
 Date of Grid Connection: 21/07/1971 Cumulative Load Factor: 69.9%
 Date of Commercial Operation: 01 Mar 1972 Cumulative Unit Capability Factor: 70.0%
 Cumulative Energy Unavailability Factor: 30.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	1513.2	495	35.0	35.0	35.0	35.0	35.0	35.0	0	0.0
1973	1118.5	420	33.1	34.1	30.5	32.9	30.5	32.9	0	0.0
1974	2182.0	420	59.5	42.1	59.5	41.3	59.5	41.3	8568	98.1
1975	791.5	420	21.6	37.2	21.6	36.6	21.6	36.6	4437	50.8
1976	2409.0	420	66.8	43.0	66.8	42.5	64.4	42.0	8633	97.0
1977	2492.0	420	73.5	47.9	70.0	46.9	67.9	46.2	8008	91.7
1978	1900.5	420	52.5	48.6	52.5	47.7	51.8	47.0	7739	88.6
1979	2600.0	420	74.9	51.8	74.9	51.0	70.9	49.9	8694	99.5
1980	2882.0	420	78.1	54.6	78.1	54.0	78.5	53.0	8609	98.5
1981	3117.0	420	83.2	57.5	83.2	56.9	83.3	56.0	8823	99.1
1982	3020.0	420	81.7	59.7	81.7	59.1	81.4	58.3	8700	98.5
1983	3148.0	420	83.9	61.6	83.9	61.1	85.8	60.6	8715	99.8
1984	3378.5	420	89.5	63.7	89.5	63.3	92.1	62.9	8728	99.9
1985	3341.3	420	88.5	65.5	88.4	65.1	91.1	64.9	8736	100.0
1986	2050.0	420	62.1	65.3	61.9	64.8	55.7	64.3	7939	90.6
1987	2249.7	420	59.1	64.9	58.8	64.5	60.2	64.1	8611	96.7
1988	3086.2	420	84.3	66.0	83.8	65.6	84.1	65.2	8530	97.6
1989	3307.0	420	86.9	67.2	86.9	66.8	89.6	66.6	8572	97.6
1990	3373.2	420	89.9	68.3	89.9	68.0	91.9	67.9	8549	97.9
1991	3725.7	420	91.5	69.5	89.7	69.0	101.5	69.5	8374	95.9
1992	3897.6	475	92.3	70.7	92.1	70.3	92.2	70.8	8904	100.0
1993	3607.6	475	87.0	71.5	86.8	71.1	86.9	71.6	8477	97.0
1994	3055.5	475	76.1	71.8	72.4	71.2	73.6	71.7	6933	79.4
1995	3765.9	475	90.5	72.6	90.5	72.1	90.5	72.5	8760	100.0
1996	3150.5	475	75.5	72.7	75.5	72.2	75.5	72.7	7445	84.8
1997	3979.4	490	92.7	73.6	92.7	73.1	92.7	73.5	8342	95.2
1998	3329.1	490	78.1	73.8	78.1	73.3	77.6	73.7	7128	81.4
1999	4035.4	490	93.8	74.6	93.0	74.1	94.0	74.5	8656	98.8
2000	887.0	490	20.6	72.5	20.6	72.0	20.6	72.4	2208	25.1
2001	1286.4	490	30.0	70.9	30.0	70.5	30.0	70.9	3198	36.5
2002	3417.2	490	80.0	71.3	79.5	70.8	79.6	71.2	7385	84.3
2003	3354.4	490	78.6	71.5	78.1	71.1	78.1	71.4	7544	86.1
2004	3247.0	490	75.4	71.6	75.4	71.2	75.4	71.6	7296	83.1
2005	3782.0	490	88.9	72.2	88.1	71.7	88.1	72.1	8645	98.7
2006	1932.6	490	45.0	71.4	45.0	70.9	45.0	71.2	6020	68.7
2007	3198.8	490	75.1	71.5	74.5	71.0	74.5	71.3	7871	89.9
2008	2080.9	490	48.3	70.8	48.3	70.4	48.3	70.7	5427	61.8
2009	3259.4	490	76.3	70.9	75.9	70.5	75.9	70.8	8623	98.4
2010	1584.6	490	36.9	70.0	36.9	69.6	36.9	69.9	4235	48.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		78			406	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling				197		
D. Inspection, maintenance or repair without refuelling	2816			690		
E. Testing of plant systems or components					1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				108		
H. Nuclear regulatory requirements		1631			12	
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						14
Subtotal	2816	1709	0	995	426	16
Total		4525			1437	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		34
12. Reactor I&C Systems	78	12
14. Safety Systems		4
15. Reactor Cooling Systems		45
16. Steam generation systems		178
17. Safety I&C Systems (excluding reactor I&C)		10
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		81
32. Feedwater and Main Steam System		10
41. Main Generator Systems		4
42. Electrical Power Supply Systems		17
Total	78	399

US-313 ARKANSAS ONE-1

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF) at the beginning of 2010: 842.0 MW(e)
Design Net Capacity: 850.0 MW(e)
Design Discharge Burnup: 35000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6607.1 GW(e).h
Energy Availability Factor: 90.0%
Load Factor: 89.6%
Operating Factor: 90.0%
Energy Unavailability Factor: 10.0%
Total Off-line Time: 877 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	639.6	577.9	414.6	38.5	589.6	605.3	623.1	619.6	609.0	634.3	617.1	638.5	6607.1
EAF (%)	100.0	100.0	64.5	15.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.0
UCF (%)	100.0	100.0	64.5	15.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.0
LF (%)	102.1	102.1	66.3	6.4	94.1	99.8	99.5	98.9	100.5	101.3	101.6	101.9	89.6
OF (%)	100.0	100.0	65.5	13.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.0
EUf (%)	0.0	0.0	35.5	85.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0
PUf (%)	0.0	0.0	35.5	81.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7
UCLF (%)	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1968
Date of First Criticality: 08 Jun 1974
Date of Grid Connection: 17/08/1974
Date of Commercial Operation: 19/12/1974
Lifetime Generation: 199656.7 GW(e).h
Cumulative Energy Availability Factor: 79.6%
Cumulative Load Factor: 75.6%
Cumulative Unit Capability Factor: 80.0%
Cumulative Energy Unavailability Factor: 20.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974			Data not provided							
1975	4898.4	797	67.7	67.7	67.7	67.7	70.2	70.2	6661	76.0
1976	3888.0	836	53.0	60.2	53.0	60.2	52.9	61.3	4966	56.5
1977	5103.1	836	69.7	63.4	69.7	63.4	69.7	64.2	6688	76.3
1978	5249.8	836	71.7	65.5	71.7	65.5	71.7	66.1	6676	76.2
1979	3323.4	836	45.4	61.4	45.4	61.4	45.4	61.9	4253	48.6
1980	3781.2	836	74.8	63.7	63.7	61.8	51.5	60.1	5570	63.4
1981	4900.8	836	72.5	65.0	72.5	63.4	66.9	61.1	6336	72.3
1982	3721.4	836	64.8	64.9	64.8	63.5	50.8	59.8	5671	64.7
1983	3220.6	836	48.3	63.1	48.3	61.8	44.0	58.1	4191	47.8
1984	4604.1	836	70.1	63.8	70.1	62.7	62.7	58.5	6150	70.0
1985	5190.4	836	78.3	65.1	78.3	64.1	70.9	59.6	6852	78.2
1986	3589.9	836	62.2	64.9	62.2	63.9	49.0	58.8	5446	62.2
1987	4763.3	836	88.2	66.7	88.2	65.8	65.0	59.2	7720	88.1
1988	3963.2	836	68.3	66.8	68.3	66.0	54.0	58.9	5996	68.3
1989	3377.0	836	67.1	66.8	67.1	66.0	46.1	58.0	5871	67.0
1990	4145.8	836	75.9	67.4	75.9	66.7	56.6	57.9	6437	73.5
1991	6540.5	836	91.3	68.8	91.3	68.1	89.3	59.8	7991	91.2
1992	5833.1	836	80.7	69.4	80.7	68.8	79.4	60.9	7088	80.7
1993	6126.5	836	85.9	70.3	85.9	69.7	83.7	62.1	7520	85.8
1994	7198.6	836	98.7	71.7	98.7	71.2	98.3	63.9	8643	98.7
1995	5978.2	836	85.6	72.4	85.6	71.9	81.6	64.7	7493	85.5
1996	6287.0	836	86.7	73.0	86.7	72.5	85.6	65.7	7613	86.7
1997	7251.1	836	99.6	74.2	99.6	73.7	99.0	67.1	8723	99.6
1998	6216.8	836	84.1	74.6	84.1	74.1	84.9	67.9	7364	84.1
1999	6714.7	836	90.3	75.2	90.3	74.8	91.7	68.8	7907	90.3
2000	6410.1	836	88.2	75.7	88.2	75.3	87.3	69.5	7748	88.2
2001	6875.5	836	91.8	76.3	91.8	75.9	93.9	70.4	8100	92.5
2002	6568.6	836	89.1	76.8	89.1	76.4	89.7	71.1	7820	89.3
2003	6794.3	836	91.8	77.3	91.8	76.9	92.8	71.9	8050	91.9
2004	6827.6	836	91.6	77.8	91.6	77.4	93.0	72.6	8045	91.6
2005	5743.2	840	77.4	77.8	77.4	77.4	78.1	72.8	6778	77.4
2006	7474.9	836	100.0	78.5	100.0	78.1	102.1	73.7	8760	100.0
2007	6882.8	843	92.8	78.9	92.8	78.6	93.2	74.3	8122	92.7
2008	6124.0	843	86.1	79.1	86.1	78.8	82.7	74.5	7558	86.0
2009	7302.1	842	98.1	79.7	98.1	79.3	99.0	75.2	8595	98.1
2010	6607.1	842	90.0	80.0	90.0	79.6	89.6	75.6	7883	90.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					561	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	851			816		
D. Inspection, maintenance or repair without refuelling				131		
E. Testing of plant systems or components				3	2	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				52		
H. Nuclear regulatory requirements						44
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				52	3	
L. Human factor related		24				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					1	
P. Fire					3	
Subtotal	851	24	0	1054	575	45
Total		875			1674	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		82
12. Reactor I&C Systems		35
13. Reactor Auxiliary Systems		14
14. Safety Systems		25
15. Reactor Cooling Systems		42
16. Steam generation systems		48
17. Safety I&C Systems (excluding reactor I&C)		19
31. Turbine and auxiliaries		104
32. Feedwater and Main Steam System		64
33. Circulating Water System		9
35. All other I&C Systems		1
41. Main Generator Systems		79
42. Electrical Power Supply Systems		32
XX. Miscellaneous Systems		0
Total	0	554

US-368 ARKANSAS ONE-2

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 993.0 MW(e)
Design Net Capacity: 912.0 MW(e)
Design Discharge Burnup: 35000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8415.6 GW(e).h
Energy Availability Factor: 96.7%
Load Factor: 96.7%
Operating Factor: 96.7%
Energy Unavailability Factor: 3.3%
Total Off-line Time: 288 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	750.7	617.8	749.6	724.6	744.5	714.1	737.6	521.3	632.6	747.1	726.0	749.8	8415.6
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	70.9	90.2	100.0	100.0	100.0	96.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	70.9	90.2	100.0	100.0	100.0	96.7
LF (%)	101.6	92.6	101.6	101.3	100.8	99.9	99.8	70.6	88.5	101.1	101.4	101.5	96.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	71.5	89.4	100.0	100.0	100.0	96.7
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.1	9.8	0.0	0.0	0.0	3.3
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.2	9.8	0.0	0.0	0.0	3.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 12 Jun 1968
Date of First Criticality: 12 May 1978
Date of Grid Connection: 26/12/1978
Date of Commercial Operation: 26/03/1980

Lifetime Generation: 202404.2 GW(e).h
Cumulative Energy Availability Factor: 83.8%
Cumulative Load Factor: 83.9%
Cumulative Unit Capability Factor: 84.0%
Cumulative Energy Unavailability Factor: 16.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	3646.6	884	80.2	80.2	73.5	73.5	60.8	60.8	4913	72.8
1981	4323.6	858	65.2	71.9	65.2	68.9	57.5	59.0	5622	64.2
1982	3807.5	858	57.9	66.9	57.9	65.0	50.7	56.0	5023	57.3
1983	4427.9	858	61.5	65.5	61.5	64.0	58.9	56.8	5380	61.4
1984	6203.6	858	84.7	69.5	84.7	68.4	82.3	62.1	7439	84.7
1985	4701.2	858	69.2	69.4	69.0	68.5	62.5	62.2	6040	68.9
1986	5314.3	858	71.6	69.8	71.6	68.9	70.7	63.4	6274	71.6
1987	6605.2	858	87.7	72.1	87.7	71.3	87.9	66.6	7678	87.6
1988	4952.9	858	66.8	71.5	66.8	70.8	65.7	66.5	5867	66.8
1989	5472.2	858	74.4	71.8	74.4	71.2	72.8	67.1	6514	74.4
1990	7129.6	858	93.8	73.8	93.8	73.3	94.9	69.7	8211	93.7
1991	6123.3	858	82.1	74.5	82.1	74.0	81.5	70.7	7187	82.0
1992	5504.8	858	72.8	74.4	72.8	73.9	73.0	70.9	6390	72.7
1993	7344.7	858	95.3	75.9	95.3	75.5	97.7	72.8	8346	95.3
1994	6724.9	858	88.0	76.7	88.0	76.3	89.5	73.9	7707	88.0
1995	5694.5	858	75.9	76.6	75.9	76.3	75.8	74.1	6644	75.8
1996	7063.9	858	91.6	77.5	91.6	77.2	93.7	75.2	8049	91.6
1997	6957.0	858	91.5	78.3	91.5	78.0	92.6	76.2	8013	91.5
1998	6877.3	858	91.3	79.0	91.3	78.7	91.5	77.0	7995	91.3
1999	6226.9	858	82.4	79.2	82.4	78.9	82.8	77.3	7219	82.4
2000	5265.3	858	69.2	78.7	69.2	78.4	69.9	76.9	6077	69.2
2001	7917.0	858	96.8	79.5	96.8	79.3	105.3	78.2	8498	97.0
2002	8002.2	858	93.1	80.1	93.1	79.9	106.5	79.5	8203	93.6
2003	7925.7	858	92.5	80.6	92.5	80.4	105.5	80.6	8156	93.1
2004	8627.6	1000	97.7	81.4	97.7	81.2	98.2	81.4	8580	97.7
2005	7959.5	1000	90.9	81.9	90.9	81.7	90.9	81.8	7966	90.9
2006	7765.4	998	89.0	82.2	89.0	82.0	88.8	82.1	7793	89.0
2007	8603.3	995	98.0	82.8	98.0	82.6	98.7	82.8	8584	98.0
2008	8060.4	995	93.0	83.2	93.0	83.0	92.2	83.2	8166	93.0
2009	7867.9	997	91.2	83.5	91.2	83.3	90.1	83.4	7986	91.2
2010	8415.6	993	96.7	84.0	96.7	83.8	96.7	83.9	8472	96.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1979 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					502	
B. Refuelling without a maintenance					12	
C. Inspection, maintenance or repair combined with refuelling				864		
D. Inspection, maintenance or repair without refuelling				126		
E. Testing of plant systems or components				12	19	
H. Nuclear regulatory requirements		286				
J. Grid limitation, failure or grid unavailability						14
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	3	0
Z. Others					0	
Subtotal	0	286	0	1002	536	14
Total		286			1552	

7. Equipment Related Full Outages, Analysis by System

System	2010	1979 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		66
13. Reactor Auxiliary Systems		19
14. Safety Systems		88
15. Reactor Cooling Systems		144
16. Steam generation systems		25
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		45
32. Feedwater and Main Steam System		56
33. Circulating Water System		3
41. Main Generator Systems		10
42. Electrical Power Supply Systems		30
Total	0	493

US-334 BEAVER VALLEY-1

Operator: FENOC (FIRST ENERGY NUCLEAR OPERATING CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 892.0 MW(e)
Design Net Capacity: 835.0 MW(e)
Design Discharge Burnup: 43727 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7119.4 GW(e).h
Energy Availability Factor: 90.9%
Load Factor: 91.1%
Operating Factor: 90.9%
Energy Unavailability Factor: 9.1%
Total Off-line Time: 797 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	682.1	616.5	679.5	596.0	675.7	648.0	665.4	667.4	648.3	5.9	561.4	673.1	7119.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	89.5	100.0	90.9
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	89.5	100.0	90.9
LF (%)	102.8	102.9	102.5	92.8	101.8	100.9	100.3	100.6	100.9	0.9	87.3	101.4	91.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	89.3	100.0	90.9
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	10.5	0.0	9.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	10.5	0.0	9.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 26/06/1970
Date of First Criticality: 05 Oct 1976
Date of Grid Connection: 14/06/1976
Date of Commercial Operation: 10 Jan 1976

Lifetime Generation: 174000.7 GW(e).h
Cumulative Energy Availability Factor: 73.5%
Cumulative Load Factor: 70.3%
Cumulative Unit Capability Factor: 73.5%
Cumulative Energy Unavailability Factor: 26.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	303.2	834	100.0	100.0	100.0	100.0	16.1	16.1	821	37.2
1977	2870.3	843	39.2	51.6	39.2	51.6	38.9	34.2	4312	49.2
1978	2481.4	800	35.4	44.6	35.4	44.6	35.4	34.7	3569	40.7
1979	1778.4	815	24.8	38.6	24.8	38.6	24.9	31.7	3498	39.9
1980	300.7	811	6.9	31.2	6.9	31.2	4.2	25.3	600	6.8
1981	4674.7	810	73.9	39.2	73.9	39.2	65.9	33.0	6444	73.6
1982	2717.4	810	41.7	39.6	41.7	39.6	38.3	33.8	3644	41.6
1983	4682.2	810	68.5	43.6	68.5	43.6	66.0	38.2	5976	68.2
1984	4756.8	810	71.8	47.0	71.8	47.0	66.9	41.7	6301	71.7
1985	5901.5	810	91.9	51.8	91.9	51.8	83.2	46.1	8046	91.8
1986	4784.2	810	70.7	53.7	70.7	53.7	67.4	48.2	6195	70.7
1987	5620.9	810	84.0	56.3	84.0	56.3	79.2	50.9	7320	83.6
1988	4993.6	810	79.6	58.2	79.6	58.2	70.2	52.5	6989	79.6
1989	3794.3	810	66.5	58.9	66.5	58.9	53.5	52.6	5822	66.5
1990	6167.1	810	92.2	61.2	92.2	61.2	86.9	55.0	8074	92.2
1991	3710.9	810	55.8	60.8	55.8	60.8	52.3	54.8	4883	55.7
1992	6298.4	810	93.6	62.9	93.6	62.9	88.5	56.9	8218	93.6
1993	4359.8	810	67.3	63.1	67.3	63.1	61.4	57.1	5891	67.2
1994	5504.4	810	79.9	64.0	79.9	64.0	77.6	58.3	6991	79.8
1995	5449.2	810	77.8	64.7	77.8	64.7	76.8	59.2	6813	77.8
1996	5698.1	810	81.3	65.6	81.3	65.6	80.1	60.3	7132	81.2
1997	4025.8	810	56.8	65.1	56.8	65.1	56.7	60.1	4972	56.8
1998	2829.3	810	40.4	64.0	40.4	64.0	39.9	59.2	3557	40.6
1999	6106.2	810	88.5	65.1	88.5	65.1	86.1	60.3	7746	88.4
2000	5883.0	810	84.6	65.9	84.6	65.9	82.7	61.3	7430	84.6
2001	5991.0	821	84.6	66.6	84.6	66.6	84.1	62.2	7407	84.6
2002	6989.9	821	97.0	67.8	97.0	67.8	97.2	63.5	8490	96.9
2003	5985.4	821	84.1	68.4	84.1	68.4	83.2	64.2	7359	84.0
2004	6678.5	821	92.4	69.3	92.4	69.3	92.6	65.3	8119	92.4
2005	7290.3	821	100.0	70.3	100.0	70.3	101.4	66.5	8760	100.0
2006	5828.6	851	79.6	70.6	79.6	70.6	78.2	66.9	6973	79.6
2007	7057.7	892	91.6	71.4	91.6	71.4	90.3	67.7	8017	91.5
2008	7945.0	892	100.0	72.3	100.0	72.3	101.4	68.9	8784	100.0
2009	7217.5	892	91.3	73.0	91.3	73.0	92.4	69.6	7999	91.3
2010	7119.4	892	90.9	73.5	90.9	73.5	91.1	70.3	7963	90.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					632	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	796			1127	5	
D. Inspection, maintenance or repair without refuelling				102		
E. Testing of plant systems or components				9	19	
H. Nuclear regulatory requirements					111	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				19	174	2
Z. Others					2	
Subtotal	796	0	0	1257	956	2
Total		796			2215	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		31
14. Safety Systems		18
15. Reactor Cooling Systems		158
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		5
31. Turbine and auxiliaries		17
32. Feedwater and Main Steam System		124
35. All other I&C Systems		1
41. Main Generator Systems		20
42. Electrical Power Supply Systems		140
XX. Miscellaneous Systems		55
Total	0	578

US-412 BEAVER VALLEY-2

Operator: FENOC (FIRST ENERGY NUCLEAR OPERATING CO.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 885.0 MW(e)
Design Net Capacity: 836.0 MW(e)
Design Discharge Burnup: 36351 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7874.2 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 101.6%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	675.3	608.6	674.2	651.1	669.3	642.5	660.8	644.1	646.3	672.7	653.9	675.4	7874.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	102.6	102.3	102.5	102.2	101.7	100.8	100.4	97.8	101.4	102.2	102.5	102.6	101.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Mar 1974 **Lifetime Generation:** 140516.8 GW(e).h
Date of First Criticality: 08 Apr 1987 **Cumulative Energy Availability Factor:** 86.7%
Date of Grid Connection: 17/08/1987 **Cumulative Load Factor:** 83.3%
Date of Commercial Operation: 17/11/1987 **Cumulative Unit Capability Factor:** 86.7%
Cumulative Energy Unavailability Factor: 13.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	738.1	822	100.0	100.0	100.0	100.0	82.4	82.4	950	88.7
1988	6477.1	833	93.8	94.5	93.8	94.5	88.5	87.9	8224	93.6
1989	4557.1	833	71.7	83.7	71.7	83.7	62.5	75.9	6245	71.3
1990	4291.6	827	77.1	81.6	77.1	81.6	59.2	70.6	6734	76.9
1991	6762.2	820	99.5	85.9	99.5	85.9	94.1	76.2	8720	99.5
1992	5647.1	820	94.8	87.7	94.8	87.7	78.4	76.7	7342	83.6
1993	5212.7	820	77.3	86.0	77.3	86.0	72.6	76.0	6770	77.3
1994	7024.7	820	96.8	87.5	96.8	87.5	97.8	79.0	8481	96.8
1995	6047.0	820	87.0	87.4	87.0	87.4	84.2	79.7	7616	86.9
1996	4788.6	820	70.3	85.6	70.3	85.6	66.5	78.2	6169	70.2
1997	6158.7	820	86.6	85.7	86.6	85.7	85.7	79.0	7583	86.6
1998	1808.7	820	25.1	80.2	25.1	80.2	25.2	74.1	2179	24.9
1999	5752.5	820	81.7	80.4	81.7	80.4	80.1	74.6	7155	81.7
2000	6227.8	820	88.9	81.0	88.9	81.0	86.5	75.5	7804	88.8
2001	7191.7	831	99.4	82.3	99.4	82.3	99.8	77.3	8702	99.3
2002	6604.3	831	92.9	83.0	92.9	83.0	90.7	78.1	8133	92.8
2003	6637.0	831	91.8	83.6	91.8	83.6	91.2	79.0	8037	91.7
2004	7314.8	831	100.0	84.5	100.0	84.5	100.2	80.2	8784	100.0
2005	6680.0	831	93.3	85.0	93.3	85.0	91.8	80.9	8169	93.3
2006	6309.5	851	87.6	85.2	87.6	85.2	84.6	81.1	7673	87.6
2007	7473.2	846	100.0	85.9	100.0	85.9	100.8	82.1	8760	100.0
2008	6726.2	890	87.9	86.0	87.9	86.0	87.8	82.4	7744	88.2
2009	6194.0	846	86.7	86.0	86.7	86.0	83.6	82.4	7651	87.3
2010	7874.2	885	100.0	86.7	100.0	86.7	101.6	83.3	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					426	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling				647	3	
D. Inspection, maintenance or repair without refuelling				17		
E. Testing of plant systems or components				0	18	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					60	
Subtotal	0	0	0	664	513	0
Total	0			1177		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		38
14. Safety Systems		16
15. Reactor Cooling Systems		240
16. Steam generation systems		24
17. Safety I&C Systems (excluding reactor I&C)		7
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		8
35. All other I&C Systems		4
41. Main Generator Systems		7
42. Electrical Power Supply Systems		27
XX. Miscellaneous Systems		10
Total	0	422

US-456 BRAIDWOOD-1

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1178.0 MW(e)
Design Net Capacity: 1120.0 MW(e)
Design Discharge Burnup: 49000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9196.7 GW(e).h
Energy Availability Factor: 89.1%
Load Factor: 89.1%
Operating Factor: 89.1%
Energy Unavailability Factor: 10.9%
Total Off-line Time: 954 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	897.7	810.3	894.8	862.4	886.5	848.6	870.0	697.3	777.2	69.6	683.3	899.0	9196.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.7	94.9	6.5	86.4	100.0	89.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.7	94.9	6.5	86.4	100.0	89.1
LF (%)	102.4	102.4	102.2	101.7	101.1	100.1	99.3	79.6	91.6	7.9	80.5	102.6	89.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.6	94.9	9.5	83.1	100.0	89.1
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.3	5.1	93.5	13.6	0.0	10.9
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.5	13.6	0.0	9.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	5.1	0.0	0.0	0.0	1.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1975 **Lifetime Generation:** 193794.3 GW(e).h
Date of First Criticality: 29/05/1987 **Cumulative Energy Availability Factor:** 87.9%
Date of Grid Connection: 07 Dec 1987 **Cumulative Load Factor:** 86.1%
Date of Commercial Operation: 29/07/1988 **Cumulative Unit Capability Factor:** 87.9%
Cumulative Energy Unavailability Factor: 12.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	3424.2	1105	91.7	91.7	91.7	91.7	82.0	82.0	3409	91.4
1989	4649.1	1120	62.3	71.0	62.3	71.0	47.4	57.7	5435	62.0
1990	8264.6	1120	89.1	78.5	89.1	78.5	84.2	68.6	7778	88.8
1991	5018.6	1120	59.4	72.9	59.4	72.9	51.2	63.5	5198	59.3
1992	7157.9	1120	81.4	74.8	81.4	74.8	72.8	65.6	7142	81.3
1993	8693.1	1120	92.1	78.0	92.1	78.0	88.6	69.9	8048	91.9
1994	7398.2	1120	79.8	78.3	79.8	78.3	75.4	70.7	6940	79.2
1995	6614.3	1120	71.7	77.4	71.7	77.4	67.4	70.3	6214	70.9
1996	7618.9	1120	80.5	77.8	80.5	77.8	77.4	71.1	7021	79.9
1997	8096.3	1120	84.0	78.4	84.0	78.4	82.5	72.3	7339	83.8
1998	7578.8	1118	79.9	78.6	79.9	78.6	77.4	72.8	6976	79.6
1999	9904.8	1120	99.1	80.4	99.1	80.4	101.0	75.3	8680	99.1
2000	9311.3	1103	94.9	81.5	94.9	81.5	96.1	76.9	8335	94.9
2001	9557.9	1168	94.0	82.5	94.0	82.5	97.7	78.5	8247	94.1
2002	10612.2	1161	100.0	83.7	100.0	83.7	104.1	80.3	8760	100.0
2003	10094.8	1161	95.3	84.5	95.3	84.5	99.3	81.6	8353	95.4
2004	9807.2	1161	94.5	85.1	94.5	85.1	96.2	82.5	8310	94.6
2005	10277.0	1185	98.5	85.9	98.5	85.9	99.0	83.5	8630	98.5
2006	9945.9	1178	95.4	86.5	95.4	86.5	96.4	84.2	8352	95.3
2007	9526.7	1178	93.1	86.8	92.7	86.8	92.3	84.7	8119	92.7
2008	10462.9	1178	100.0	87.5	100.0	87.5	101.1	85.5	8784	100.0
2009	9826.3	1178	94.3	87.8	94.3	87.8	95.2	86.0	8259	94.3
2010	9196.7	1178	89.1	87.9	89.1	87.9	89.1	86.1	7806	89.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		158			261	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	794			604		
D. Inspection, maintenance or repair without refuelling				112	0	
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements					19	
J. Grid limitation, failure or grid unavailability					3	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	5	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	794	158	0	717	295	1
Total		952			1013	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems	36	
13. Reactor Auxiliary Systems		3
14. Safety Systems		4
15. Reactor Cooling Systems		7
16. Steam generation systems		20
17. Safety I&C Systems (excluding reactor I&C)		8
31. Turbine and auxiliaries		2
32. Feedwater and Main Steam System	121	16
41. Main Generator Systems		145
42. Electrical Power Supply Systems		10
XX. Miscellaneous Systems		11
Total	157	226

US-457 BRAIDWOOD-2

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1152.0 MW(e)
Design Net Capacity: 1120.0 MW(e)
Design Discharge Burnup: 49000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10003.2 GW(e).h
Energy Availability Factor: 98.2%
Load Factor: 99.1%
Operating Factor: 98.2%
Energy Unavailability Factor: 1.8%
Total Off-line Time: 161 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	877.9	792.8	877.0	844.3	865.1	828.2	848.8	640.2	836.1	872.3	847.8	872.7	10003.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	78.5	100.0	100.0	100.0	100.0	98.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	78.5	100.0	100.0	100.0	100.0	98.2
LF (%)	102.4	102.4	102.5	101.8	100.9	99.8	99.0	74.7	100.8	101.8	102.1	101.8	99.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	78.4	100.0	100.0	100.0	100.0	98.2
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.5	0.0	0.0	0.0	0.0	1.8
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.5	0.0	0.0	0.0	0.0	1.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1975 **Lifetime Generation:** 195391.5 GW(e).h
Date of First Criticality: 03 Aug 1988 **Cumulative Energy Availability Factor:** 90.9%
Date of Grid Connection: 25/05/1988 **Cumulative Load Factor:** 88.7%
Date of Commercial Operation: 17/10/1988 **Cumulative Unit Capability Factor:** 91.0%
Cumulative Energy Unavailability Factor: 9.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	1350.9	1097	81.9	81.9	81.9	81.9	66.6	66.6	1476	81.5
1989	7142.0	1120	86.9	86.0	86.9	86.0	72.8	71.7	7581	86.5
1990	6353.6	1120	78.8	82.8	78.8	82.8	64.8	68.6	6849	78.2
1991	6545.5	1120	75.7	80.6	75.7	80.6	66.7	68.0	6626	75.6
1992	8751.1	1120	95.1	84.0	95.1	84.0	89.0	73.0	8346	95.0
1993	7362.3	1120	81.5	83.5	81.5	83.5	75.0	73.4	7098	81.0
1994	6636.1	1120	74.1	82.0	74.1	82.0	67.6	72.5	6454	73.7
1995	9533.0	1120	98.1	84.2	98.1	84.2	97.2	75.9	8583	98.0
1996	8011.8	1120	84.1	84.2	84.1	84.2	81.4	76.6	7349	83.7
1997	8234.7	1120	86.5	84.5	86.5	84.5	83.9	77.4	7563	86.3
1998	9694.6	1118	97.7	85.8	97.7	85.8	99.0	79.5	8552	97.6
1999	9030.9	1120	92.3	86.3	92.3	86.3	92.0	80.6	8070	92.1
2000	9510.9	1103	94.6	87.0	94.6	87.0	98.1	82.0	8303	94.5
2001	9647.9	1122	96.7	87.7	96.7	87.7	99.0	83.3	8481	96.8
2002	9449.5	1154	92.5	88.1	92.5	88.1	94.3	84.1	8099	92.5
2003	9932.2	1154	95.1	88.6	95.1	88.6	98.3	85.0	8337	95.2
2004	10201.0	1129	99.7	89.3	99.7	89.3	102.7	86.1	8757	99.7
2005	9519.4	1177	94.1	89.5	94.1	89.5	92.3	86.5	8244	94.1
2006	9624.6	1152	95.2	89.9	95.2	89.9	95.4	87.0	8335	95.1
2007	10131.2	1152	100.0	90.4	99.4	90.4	100.4	87.7	8706	99.4
2008	9323.2	1152	92.3	90.5	92.3	90.5	92.1	87.9	8106	92.3
2009	9401.7	1152	92.7	90.6	92.7	90.6	93.2	88.2	8121	92.7
2010	10003.2	1152	98.2	91.0	98.2	90.9	99.1	88.7	8599	98.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		160			134	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling				539		
D. Inspection, maintenance or repair without refuelling				70		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					16	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	0	160	0	609	161	2
Total		160			772	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		11
14. Safety Systems		8
15. Reactor Cooling Systems		8
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries		0
32. Feedwater and Main Steam System		16
35. All other I&C Systems		4
41. Main Generator Systems	160	11
42. Electrical Power Supply Systems		56
XX. Miscellaneous Systems		2
Total	160	124

US-259 BROWNS FERRY-1

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1065.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8072.3 GW(e).h
 Energy Availability Factor: 91.5%
 Load Factor: 86.1%
 Operating Factor: 91.4%
 Energy Unavailability Factor: 8.5%
 Total Off-line Time: 753 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	816.0	737.4	810.9	780.7	798.1	710.2	621.3	458.8	766.8	571.2	169.3	831.7	8072.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	71.0	27.6	100.0	91.5
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	71.0	27.6	100.0	91.5
LF (%)	103.0	103.0	102.5	101.8	100.7	92.6	78.4	57.9	100.0	72.1	21.5	102.3	86.1
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.2	24.3	100.0	91.4
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	72.4	0.0	8.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	72.4	0.0	8.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Jan 1967
 Date of First Criticality: 17/08/1973
 Date of Grid Connection: 15/10/1973
 Date of Commercial Operation: 08 Jan 1974
 Lifetime Generation: 86078.2 GW(e).h
 Cumulative Energy Availability Factor: 65.6%
 Cumulative Load Factor: 62.6%
 Cumulative Unit Capability Factor: 65.6%
 Cumulative Energy Unavailability Factor: 34.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	2765.4	1065	85.8	85.8	85.8	85.8	70.7	70.7	3114	84.8
1975	1378.5	1065	14.8	35.8	14.8	35.8	14.8	31.3	1535	17.5
1976	1301.1	1065	13.9	26.7	13.9	26.7	13.9	24.1	2174	24.7
1977	5043.1	1065	54.1	34.7	54.1	34.7	54.1	32.9	5817	66.4
1978	5817.8	1065	62.4	41.0	62.4	41.0	62.4	39.5	7042	80.4
1979	7495.7	1065	80.3	48.2	80.3	48.2	80.3	47.1	7918	90.4
1980	6061.3	1065	73.5	52.2	73.3	52.2	64.8	49.8	6376	72.6
1981	4405.3	1065	51.0	52.0	51.0	52.0	47.2	49.5	4435	50.6
1982	7880.9	1065	91.2	56.7	91.2	56.7	84.5	53.6	7967	90.9
1983	2175.5	1065	26.5	53.5	26.5	53.5	23.3	50.4	2316	26.4
1984	7848.5	1065	90.3	57.0	90.3	57.0	83.9	53.6	7930	90.3
1985	1603.0	1065	74.9	57.4	74.9	57.4	69.7	54.0	1626	75.3
1986	Data not available - Long-term shutdown									
1987	"									
1988	"									
1989	"									
1990	"									
1991	"									
1992	"									
1993	"									
1994	"									
1995	"									
1996	"									
1997	"									
1998	"									
1999	"									
2000	"									
2001	"									
2002	"									
2003	"									
2004	"									
2005	"									
2006	"									
2007	4535.3	1065	85.4	58.9	85.4	58.9	82.9	55.5	4452	86.7
2008	8193.1	1065	87.6	61.2	87.6	61.2	87.6	58.1	7693	87.6
2009	8758.7	1065	93.0	63.6	93.0	63.6	93.9	60.8	8147	93.0
2010	8072.3	1093	91.5	65.6	91.5	65.6	86.1	62.6	8007	91.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					153	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	752			456		
D. Inspection, maintenance or repair without refuelling				51	0	
E. Testing of plant systems or components				0	11	
H. Nuclear regulatory requirements				1		0
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					349	
Subtotal	752	0	0	508	516	0
Total		752			1024	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1973 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		9
14. Safety Systems		4
15. Reactor Cooling Systems		41
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		17
41. Main Generator Systems		3
42. Electrical Power Supply Systems		18
XX. Miscellaneous Systems		8
Total	0	126

US-260 BROWNS FERRY-2

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1104.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8842.5 GW(e).h
 Energy Availability Factor: 97.8%
 Load Factor: 91.4%
 Operating Factor: 97.8%
 Energy Unavailability Factor: 2.2%
 Total Off-line Time: 192 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	668.6	762.6	709.3	806.8	830.6	686.5	638.9	466.6	779.2	834.0	816.7	842.7	8842.5
EAF (%)	82.0	100.0	100.0	100.0	100.0	92.1	100.0	100.0	100.0	100.0	100.0	100.0	97.8
UCF (%)	82.0	100.0	100.0	100.0	100.0	92.1	100.0	100.0	100.0	100.0	100.0	100.0	97.8
LF (%)	81.4	102.8	86.5	101.5	101.1	86.4	77.8	56.8	98.0	101.5	102.6	102.6	91.4
OF (%)	81.9	100.0	100.0	100.0	100.0	92.1	100.0	100.0	100.0	100.0	100.0	100.0	97.8
EUF (%)	18.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	2.2
PUF (%)	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Jan 1967
 Date of First Criticality: 20/07/1974
 Date of Grid Connection: 28/08/1974
 Date of Commercial Operation: 03 Jan 1975

Lifetime Generation: 217120.3 GW(e).h
 Cumulative Energy Availability Factor: 79.4%
 Cumulative Load Factor: 76.1%
 Cumulative Unit Capability Factor: 79.4%
 Cumulative Energy Unavailability Factor: 20.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1975	550.6	1065	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	517	7.0
1976	1567.2	1065	16.8	12.3	16.8	12.3	16.8	12.3	16.8	12.3	2547	29.0
1977	6225.0	1065	66.8	31.5	66.8	31.5	66.7	31.5	66.7	31.5	6963	79.5
1978	5547.5	1065	59.5	38.8	59.5	38.8	59.5	38.8	59.5	38.8	6032	68.9
1979	7441.4	1065	79.8	47.2	79.8	47.2	79.8	47.2	79.8	47.2	7593	86.7
1980	5618.4	1065	69.8	51.1	69.5	51.1	60.1	49.4	60.1	49.4	6073	69.1
1981	7471.9	1065	85.2	56.1	85.2	56.1	80.1	53.9	80.1	53.9	7452	85.1
1982	4450.9	1065	54.9	55.9	54.9	55.9	47.7	53.1	47.7	53.1	4778	54.5
1983	6385.6	1065	74.8	58.1	74.8	58.0	68.4	54.9	68.4	54.9	6514	74.4
1984	4044.4	1065	66.5	58.9	66.5	58.9	43.2	53.7	43.2	53.7	5844	66.5
1985	0.0	1065	0.0	57.5	0.0	57.5	0.0	52.4	0.0	52.4	0	0.0
1986	Data not available - Long-term shutdown											
1987	"											
1988	"											
1989	"											
1990	"											
1991	3804.0	1065	70.2	58.3	70.2	58.3	60.7	52.9	60.7	52.9	4125	70.1
1992	8388.8	1065	95.7	61.5	95.7	61.5	89.7	56.0	89.7	56.0	8401	95.6
1993	5776.8	1065	65.7	61.8	65.7	61.8	61.9	56.5	61.9	56.5	5753	65.7
1994	7345.2	1065	82.6	63.3	82.6	63.3	78.7	58.1	78.7	58.1	7234	82.6
1995	9197.0	1065	98.5	65.7	98.5	65.7	98.6	60.8	98.6	60.8	8629	98.5
1996	8046.3	1065	88.7	67.2	88.7	67.1	86.0	62.4	86.0	62.4	7795	88.7
1997	8372.9	1065	92.8	68.7	92.8	68.7	89.7	64.1	89.7	64.1	8130	92.8
1998	9301.0	1065	99.7	70.4	99.7	70.4	99.7	66.1	99.7	66.1	8730	99.7
1999	8586.3	1100	91.0	71.6	91.0	71.6	89.1	67.3	89.1	67.3	7985	91.2
2000	9733.5	1118	99.4	73.0	99.4	73.0	99.1	69.0	99.1	69.0	8727	99.4
2001	8414.6	1118	87.2	73.8	87.2	73.7	85.9	69.9	85.9	69.9	7636	87.2
2002	8911.3	1118	94.4	74.7	94.4	74.7	91.0	70.9	91.0	70.9	8269	94.4
2003	8369.2	1118	90.1	75.4	90.1	75.4	85.5	71.5	85.5	71.5	7888	90.0
2004	9786.0	1118	99.2	76.5	99.2	76.5	99.6	72.8	99.6	72.8	8715	99.2
2005	8802.2	1118	91.9	77.1	91.9	77.1	89.9	73.5	89.9	73.5	8052	91.9
2006	9232.6	1118	95.5	77.9	95.5	77.9	94.3	74.3	94.3	74.3	8365	95.5
2007	7606.6	1104	80.7	78.0	80.7	78.0	78.7	74.5	78.7	74.5	7229	82.5
2008	9429.9	1104	97.3	78.7	97.3	78.7	97.2	75.3	97.2	75.3	8545	97.3
2009	7808.5	1103	81.3	78.8	81.3	78.8	80.8	75.5	80.8	75.5	7122	81.3
2010	8842.5	1104	97.8	79.4	97.8	79.4	91.4	76.1	91.4	76.1	8568	97.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		56			175	
B. Refuelling without a maintenance					21	
C. Inspection, maintenance or repair combined with refuelling				894		
D. Inspection, maintenance or repair without refuelling	134			73	2	
E. Testing of plant systems or components				6	2	
H. Nuclear regulatory requirements						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					352	
Subtotal	134	56	0	973	552	0
Total		190			1525	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		9
14. Safety Systems		6
15. Reactor Cooling Systems		27
31. Turbine and auxiliaries	56	46
32. Feedwater and Main Steam System		8
35. All other I&C Systems		0
41. Main Generator Systems		14
42. Electrical Power Supply Systems		23
XX. Miscellaneous Systems		1
Total	56	163

US-296 BROWNS FERRY-3

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1105.0 MW(e)
Design Net Capacity: 1065.0 MW(e)
Design Discharge Burnup: 38000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7858.1 GW(e).h
Energy Availability Factor: 87.1%
Load Factor: 81.2%
Operating Factor: 87.0%
Energy Unavailability Factor: 12.9%
Total Off-line Time: 1135 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	839.1	693.6	0.0	549.8	831.4	782.3	676.4	400.9	748.8	830.1	813.3	692.5	7858.1
EAF (%)	100.0	92.9	0.0	76.7	100.0	100.0	100.0	93.9	100.0	100.0	100.0	82.9	87.1
UCF (%)	100.0	92.9	0.0	76.7	100.0	100.0	100.0	93.9	100.0	100.0	100.0	82.9	87.1
LF (%)	102.1	93.4	0.0	69.1	101.1	98.3	82.3	48.8	94.1	101.0	102.1	84.2	81.2
OF (%)	100.0	94.2	0.0	75.1	100.0	100.0	100.0	93.8	100.0	100.0	100.0	82.8	87.0
EUF (%)	0.0	7.1	100.0	23.3	0.0	0.0	0.0	6.1	0.0	0.0	0.0	17.1	12.9
PUF (%)	0.0	7.1	100.0	23.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	0.0	17.1	2.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jan 1968
Date of First Criticality: 08 Aug 1976
Date of Grid Connection: 09 Dec 1976
Date of Commercial Operation: 03 Jan 1977

Lifetime Generation: 178136.8 GW(e).h
Cumulative Energy Availability Factor: 81.5%
Cumulative Load Factor: 79.0%
Cumulative Unit Capability Factor: 81.6%
Cumulative Energy Unavailability Factor: 18.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	5850.9	1065	74.8	74.8	74.8	74.8	74.8	74.8	6499	88.5
1978	5554.3	1065	59.5	66.5	59.5	66.5	59.5	66.5	6225	71.1
1979	5482.5	1065	58.8	63.8	58.8	63.8	58.8	63.8	5704	65.1
1980	6936.1	1065	79.9	68.0	79.3	67.8	74.1	66.5	6949	79.1
1981	6264.8	1065	72.6	68.9	72.6	68.8	67.2	66.6	6358	72.6
1982	4892.8	1065	57.4	67.0	57.4	66.9	52.4	64.2	5022	57.3
1983	5394.3	1065	61.9	66.2	61.9	66.1	57.8	63.3	5417	61.8
1984	290.5	1065	5.7	58.5	5.7	58.4	3.1	55.6	503	5.7
1985	1526.5	1065	68.8	58.8	68.8	58.7	66.4	55.9	1496	69.3
1986	Data not available - Long-term shutdown									
1987	"									
1988	"									
1989	"									
1990	"									
1991	"									
1992	"									
1993	"									
1994	"									
1995	764.6	1065	79.5	59.1	79.5	59.0	70.4	56.1	810	79.4
1996	8803.5	1065	95.8	63.1	95.8	63.0	94.1	60.2	8412	95.8
1997	8523.4	1065	94.8	66.2	94.8	66.1	91.4	63.3	8302	94.8
1998	7884.9	1078	89.9	68.3	89.9	68.3	83.5	65.1	7863	89.8
1999	9730.6	1118	100.0	71.0	100.0	71.0	99.4	68.0	8760	100.0
2000	9097.4	1118	94.6	72.9	94.6	72.9	92.6	70.0	8311	94.6
2001	9803.4	1118	100.0	74.9	100.0	74.8	100.1	72.2	8760	100.0
2002	9260.1	1118	96.0	76.3	96.0	76.3	94.6	73.7	8407	96.0
2003	9325.7	1118	96.6	77.6	96.6	77.6	95.2	75.1	8463	96.6
2004	8701.8	1118	91.1	78.4	91.1	78.4	88.6	75.9	8000	91.1
2005	9153.7	1114	96.2	79.4	95.7	79.4	93.8	76.9	8384	95.7
2006	8638.8	1117	91.1	80.1	91.1	80.0	88.3	77.5	7974	91.0
2007	9086.1	1105	95.6	80.8	95.6	80.8	93.9	78.3	8372	95.6
2008	7300.6	1104	76.4	80.6	76.4	80.6	75.3	78.2	6794	77.3
2009	9175.4	1104	95.9	81.3	95.9	81.3	94.9	78.9	8433	96.3
2010	7858.1	1105	87.1	81.6	87.1	81.5	81.2	79.0	7625	87.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		173			196	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	960			500	229	
D. Inspection, maintenance or repair without refuelling				22		
E. Testing of plant systems or components				4		
H. Nuclear regulatory requirements						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	14	
L. Human factor related					2	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Z. Others					1	
Subtotal	960	173	0	528	447	2
Total		1133			977	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1977 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems	45	12
14. Safety Systems		14
15. Reactor Cooling Systems		36
31. Turbine and auxiliaries	127	52
32. Feedwater and Main Steam System		22
41. Main Generator Systems		14
42. Electrical Power Supply Systems		18
XX. Miscellaneous Systems		1
Total	172	180

US-325 BRUNSWICK-1

Operator: PROGRESS (PROGRESS ENERGY)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 938.0 MW(e)
 Design Net Capacity: 821.0 MW(e)
 Design Discharge Burnup: 27800 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6810.9 GW(e).h
 Energy Availability Factor: 82.8%
 Load Factor: 82.9%
 Operating Factor: 82.8%
 Energy Unavailability Factor: 17.2%
 Total Off-line Time: 1505 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	697.4	570.8	0.0	43.3	616.9	677.0	700.6	703.8	689.1	706.1	700.7	705.3	6810.9
EAF (%)	100.0	92.9	-0.1	13.1	88.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.8
UCF (%)	100.0	92.9	-0.1	13.1	88.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.8
LF (%)	99.9	90.5	0.0	6.4	88.4	100.2	100.4	100.8	102.0	101.2	103.6	101.1	82.9
OF (%)	100.0	92.9	0.0	12.8	88.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	82.8
EUAF (%)	0.0	7.1	100.1	86.9	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2
PUF (%)	0.0	7.1	100.1	86.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2
UCLF (%)	0.0	0.0	0.0	0.0	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 02 Jul 1970
 Date of First Criticality: 10 Aug 1976
 Date of Grid Connection: 12 Apr 1976
 Date of Commercial Operation: 18/03/1977

Lifetime Generation: 176319.2 GW(e).h
 Cumulative Energy Availability Factor: 74.6%
 Cumulative Load Factor: 72.4%
 Cumulative Unit Capability Factor: 74.9%
 Cumulative Energy Unavailability Factor: 25.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1977	2515.8	790	43.4	43.4	43.4	43.4	43.4	43.4	43.4	3920	53.4
1978	5122.9	790	74.1	60.1	74.1	60.1	74.0	60.0	74.0	7624	87.0
1979	3169.2	790	45.8	55.1	45.8	55.1	45.8	55.0	45.8	4778	54.5
1980	3939.2	790	69.7	58.9	69.7	58.9	56.8	55.5	56.8	6045	68.8
1981	2574.8	790	49.0	56.8	49.0	56.8	37.2	51.7	37.2	4155	47.4
1982	2935.4	790	62.9	57.9	62.9	57.9	42.4	50.1	42.4	5428	62.0
1983	1419.1	790	26.4	53.3	26.4	53.3	20.5	45.8	20.5	2116	24.2
1984	5037.7	790	81.4	56.9	79.8	56.7	72.6	49.2	72.6	6797	77.4
1985	1942.5	790	38.9	54.9	38.9	54.7	28.1	46.8	28.1	3247	37.1
1986	5973.8	790	92.2	58.6	92.2	58.5	86.3	50.8	86.3	8068	92.1
1987	4057.9	790	65.6	59.3	65.6	59.1	58.6	51.6	58.6	5651	64.5
1988	4458.4	790	74.5	60.6	74.5	60.4	64.2	52.6	64.2	6514	74.2
1989	4193.8	790	64.6	60.9	64.6	60.8	60.6	53.2	60.6	5568	63.6
1990	4340.3	790	68.4	61.4	68.4	61.3	62.7	53.9	62.7	5909	67.5
1991	4400.3	780	67.3	61.8	67.3	61.7	64.4	54.6	64.4	5849	66.8
1992	1874.5	767	28.3	59.8	28.3	59.7	27.8	53.0	27.8	2486	28.3
1993	0.0	767	0.0	56.3	0.0	56.2	0.0	49.9	0.0	0	0.0
1994	5956.3	767	88.6	58.1	88.6	58.0	88.7	52.0	88.7	7755	88.5
1995	5780.7	767	84.4	59.4	84.4	59.3	86.0	53.8	86.0	7391	84.4
1996	5708.2	767	88.6	60.9	85.3	60.6	84.7	55.3	84.7	7490	85.3
1997	6857.0	767	97.7	62.6	97.7	62.4	102.1	57.5	102.1	8558	97.7
1998	6360.4	820	91.4	64.0	89.9	63.7	88.5	59.0	88.5	7811	89.2
1999	6998.2	820	99.0	65.6	96.8	65.2	97.4	60.8	97.4	8481	96.8
2000	6746.5	820	92.5	66.8	92.5	66.4	93.7	62.2	93.7	8122	92.5
2001	7303.1	820	100.0	68.1	100.0	67.8	101.7	63.8	101.7	8760	100.0
2002	6697.3	820	89.9	69.0	89.9	68.7	93.2	65.0	93.2	7874	89.9
2003	7701.8	872	98.9	70.2	98.9	69.9	100.8	66.5	100.8	8653	98.8
2004	7093.4	872	90.5	71.0	89.4	70.7	92.6	67.5	92.6	7853	89.4
2005	7755.1	872	94.5	71.9	94.5	71.6	101.5	68.8	101.5	8275	94.5
2006	7190.8	938	86.8	72.5	86.8	72.2	87.5	69.5	87.5	7601	86.8
2007	7881.9	938	94.6	73.3	94.6	73.0	95.9	70.5	95.9	8290	94.6
2008	7030.6	938	84.9	73.8	84.9	73.5	85.3	71.1	85.3	7458	84.9
2009	8022.7	938	97.0	74.6	97.0	74.3	97.6	72.0	97.6	8493	97.0
2010	6810.9	938	82.8	74.9	82.8	74.6	82.9	72.4	82.9	7255	82.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		85			351	
B. Refuelling without a maintenance					37	
C. Inspection, maintenance or repair combined with refuelling	1418			1216		
D. Inspection, maintenance or repair without refuelling				458		
E. Testing of plant systems or components				6	63	
H. Nuclear regulatory requirements					13	
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	18
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	1418	85	0	1680	475	24
Total		1503			2179	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	85	15
13. Reactor Auxiliary Systems		10
14. Safety Systems		24
15. Reactor Cooling Systems		61
21. Fuel Handling and Storage Facilities		5
31. Turbine and auxiliaries		33
32. Feedwater and Main Steam System		14
41. Main Generator Systems		91
42. Electrical Power Supply Systems		47
XX. Miscellaneous Systems		10
Total	85	310

US-324 BRUNSWICK-2

Operator: PROGRESS (PROGRESS ENERGY)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 920.0 MW(e)
Design Net Capacity: 821.0 MW(e)
Design Discharge Burnup: 27800 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8000.0 GW(e).h
Energy Availability Factor: 98.6%
Load Factor: 99.3%
Operating Factor: 98.6%
Energy Unavailability Factor: 1.4%
Total Off-line Time: 121 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	685.9	506.1	698.4	678.8	668.1	666.8	688.3	686.9	652.9	698.2	675.1	694.6	8000.0
EAF (%)	99.0	83.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6
UCF (%)	99.0	83.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6
LF (%)	100.2	81.9	102.2	102.5	97.6	100.7	100.6	100.3	98.6	102.0	101.8	101.5	99.3
OF (%)	98.9	83.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.6
EUF (%)	1.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
PUF (%)	0.0	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
UCLF (%)	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 02 Jul 1970 **Lifetime Generation:** 176424.3 GW(e).h
Date of First Criticality: 20/03/1975 **Cumulative Energy Availability Factor:** 73.5%
Date of Grid Connection: 29/04/1975 **Cumulative Load Factor:** 70.3%
Date of Commercial Operation: 11 Mar 1975 **Cumulative Unit Capability Factor:** 73.9%
Cumulative Energy Unavailability Factor: 26.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	706.8	804	93.2	93.2	93.2	93.2	58.8	58.8	1364	93.2
1976	2486.6	789	35.8	44.3	35.8	44.3	35.9	39.3	4911	55.9
1977	2436.6	790	35.3	40.1	35.3	40.1	35.2	37.4	4872	55.6
1978	4794.6	790	69.3	49.3	69.3	49.3	69.3	47.4	7018	80.1
1979	3652.1	790	52.8	50.1	52.8	50.1	52.8	48.7	5741	65.5
1980	1864.6	790	38.1	47.8	38.1	47.8	26.9	44.5	3086	35.1
1981	3283.9	790	68.0	51.1	68.0	51.1	47.5	45.0	5800	66.2
1982	1942.1	790	41.4	49.7	41.4	49.7	28.1	42.6	3378	38.6
1983	3941.7	790	65.3	51.6	65.3	51.6	57.0	44.4	5630	64.3
1984	1429.0	790	28.9	49.2	28.9	49.2	20.6	41.8	2236	25.5
1985	5021.9	790	84.1	52.6	80.0	52.2	72.6	44.8	6983	79.7
1986	2933.1	790	48.5	52.2	48.5	51.9	42.4	44.6	4027	46.0
1987	5694.1	790	94.0	55.6	94.0	55.3	82.3	47.7	8203	93.6
1988	3929.2	790	62.8	56.2	62.8	55.9	56.6	48.4	5361	61.0
1989	4195.4	790	67.4	57.0	67.4	56.7	60.6	49.2	5763	65.8
1990	4067.4	790	66.1	57.6	66.1	57.3	58.8	49.8	5616	64.1
1991	3664.2	775	57.8	57.6	57.8	57.3	54.0	50.1	4959	56.6
1992	1315.1	754	25.1	55.8	25.1	55.5	19.9	48.4	2200	25.0
1993	4000.9	754	63.1	56.2	63.1	55.9	60.6	49.1	5525	63.1
1994	4823.2	754	73.5	57.0	73.5	56.8	73.0	50.3	6436	73.5
1995	6216.0	754	100.0	59.1	100.0	58.9	94.1	52.3	8760	100.0
1996	5188.1	754	86.9	60.3	82.9	60.0	78.3	53.5	7277	82.8
1997	6055.4	754	89.2	61.6	89.2	61.2	91.7	55.2	7816	89.2
1998	6963.5	811	98.9	63.3	97.7	62.9	98.0	57.1	8539	97.5
1999	6095.2	811	89.2	64.4	86.5	63.9	85.8	58.3	7577	86.5
2000	7055.0	811	98.1	65.8	98.1	65.3	99.0	60.0	8616	98.1
2001	6540.4	811	91.3	66.8	91.3	66.3	92.1	61.3	7996	91.3
2002	7078.6	811	98.3	68.0	98.3	67.5	99.6	62.7	8609	98.3
2003	7028.1	811	91.0	68.8	91.0	68.4	98.9	64.1	7966	90.9
2004	7756.8	900	98.5	70.0	98.5	69.6	98.1	65.4	8639	98.3
2005	6781.7	811	88.2	70.6	88.2	70.2	95.4	66.4	7724	88.2
2006	7361.3	937	91.0	71.4	91.0	71.0	89.7	67.3	7972	91.0
2007	7140.3	937	87.3	72.0	87.3	71.6	87.0	68.0	7645	87.3
2008	7854.2	937	96.2	72.8	96.2	72.5	95.4	69.0	8448	96.2
2009	6410.2	920	80.3	73.1	80.3	72.7	79.5	69.3	7060	80.6
2010	8000.0	920	98.6	73.9	98.6	73.5	99.3	70.3	8639	98.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		7			640	
B. Refuelling without a maintenance					49	
C. Inspection, maintenance or repair combined with refuelling				1152		
D. Inspection, maintenance or repair without refuelling	112			363		
E. Testing of plant systems or components				12	3	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements					6	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	29
Subtotal	112	7	0	1527	703	29
Total		119			2259	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1975 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		23
13. Reactor Auxiliary Systems		13
14. Safety Systems		35
15. Reactor Cooling Systems		247
31. Turbine and auxiliaries	7	84
32. Feedwater and Main Steam System		52
33. Circulating Water System		0
41. Main Generator Systems		30
42. Electrical Power Supply Systems		68
XX. Miscellaneous Systems		5
Total	7	560

US-454 BYRON-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1164.0 MW(e)
 Design Net Capacity: 1120.0 MW(e)
 Design Discharge Burnup: 49000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10337.3 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 101.4%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	887.8	802.6	886.4	850.8	877.8	844.6	869.2	869.2	827.9	879.1	857.4	884.5	10337.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	102.5	102.6	102.5	101.5	101.4	100.8	100.4	100.4	98.8	101.5	102.2	102.1	101.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation**5. Historical Summary**

Date of Construction Start: 04 Jan 1975
 Date of First Criticality: 02 Feb 1985
 Date of Grid Connection: 03 Jan 1985
 Date of Commercial Operation: 16/09/1985

Lifetime Generation: 212934.6 GW(e).h
 Cumulative Energy Availability Factor: 88.0%
 Cumulative Load Factor: 84.7%
 Cumulative Unit Capability Factor: 88.0%
 Cumulative Energy Unavailability Factor: 12.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	1012.9	1124	46.8	46.8	46.8	46.8	34.9	34.9	1191	46.4
1986	7396.0	1129	89.1	79.5	89.1	79.5	74.8	65.7	7760	88.6
1987	5355.7	1125	69.6	75.2	68.7	74.8	54.3	60.8	6005	68.6
1988	6303.7	1112	72.9	74.5	72.9	74.2	64.5	61.9	6393	72.8
1989	8945.5	1105	99.7	80.3	99.7	80.1	92.4	68.9	8737	99.7
1990	6951.7	1105	80.3	80.3	80.3	80.1	71.8	69.5	7059	80.6
1991	6318.1	1105	81.3	80.5	81.3	80.3	65.3	68.8	7148	81.6
1992	8986.4	1105	99.3	83.0	99.3	82.9	92.6	72.0	8723	99.3
1993	7366.9	1105	80.9	82.8	80.9	82.7	76.1	72.5	7104	81.1
1994	6801.6	1105	81.2	82.6	81.2	82.5	70.3	72.3	7136	81.5
1995	7706.5	1105	82.3	82.6	82.3	82.5	79.6	73.0	7228	82.5
1996	6871.1	1105	74.7	81.9	74.7	81.8	70.8	72.8	6588	75.0
1997	7161.7	1105	76.8	81.5	76.8	81.4	74.0	72.9	6737	76.9
1998	7804.6	1105	81.5	81.5	81.5	81.4	80.6	73.5	7145	81.6
1999	8908.5	1105	90.6	82.1	90.6	82.1	92.0	74.8	7944	90.7
2000	9291.9	1105	94.2	82.9	94.2	82.8	95.7	76.1	8284	94.3
2001	10389.9	1163	100.0	84.0	100.0	83.9	104.1	77.9	8760	100.0
2002	9827.8	1163	94.1	84.6	94.1	84.5	96.5	79.0	8256	94.2
2003	9858.8	1163	94.0	85.1	94.0	85.1	96.8	80.0	8248	94.2
2004	10381.3	1152	100.0	85.9	100.0	85.9	102.2	81.2	8784	100.0
2005	9589.7	1194	92.9	86.3	92.9	86.2	91.7	81.8	8135	92.9
2006	9317.0	1164	90.4	86.5	90.4	86.4	91.4	82.2	7914	90.3
2007	10024.2	1164	96.8	87.0	96.8	86.9	98.3	83.0	8482	96.8
2008	9733.4	1164	94.1	87.3	94.1	87.2	95.2	83.5	8266	94.1
2009	9609.4	1164	93.3	87.5	93.3	87.5	94.2	84.0	8169	93.3
2010	10337.3	1164	100.0	88.0	100.0	88.0	101.4	84.7	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					63	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling				764		
D. Inspection, maintenance or repair without refuelling				163		
H. Nuclear regulatory requirements					13	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				3	5	3
Subtotal	0	0	0	930	89	3
Total		0			1022	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		6
21. Fuel Handling and Storage Facilities		19
31. Turbine and auxiliaries		15
32. Feedwater and Main Steam System		9
41. Main Generator Systems		0
42. Electrical Power Supply Systems		4
Total	0	55

US-455 BYRON-2

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1136.0 MW(e)
Design Net Capacity: 1120.0 MW(e)
Design Discharge Burnup: 49000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9518.4 GW(e).h
Energy Availability Factor: 94.8%
Load Factor: 95.6%
Operating Factor: 94.7%
Energy Unavailability Factor: 5.2%
Total Off-line Time: 460 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	863.0	780.3	858.6	467.7	627.8	825.0	849.2	850.0	830.8	862.5	839.1	864.6	9518.4
EAF (%)	100.0	100.0	100.0	56.7	80.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.8
UCF (%)	100.0	100.0	100.0	56.7	80.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.8
LF (%)	102.1	102.2	101.7	57.2	74.3	100.9	100.5	100.6	101.6	102.0	102.5	102.3	95.6
OF (%)	100.0	100.0	100.0	59.9	77.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.7
EUf (%)	0.0	0.0	0.0	43.3	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
PUf (%)	0.0	0.0	0.0	43.3	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 04 Jan 1975 **Lifetime Generation:** 205191.6 GW(e).h
Date of First Criticality: 01 Sep 1987 **Cumulative Energy Availability Factor:** 92.1%
Date of Grid Connection: 02 Jun 1987 **Cumulative Load Factor:** 88.5%
Date of Commercial Operation: 08 Feb 1987 **Cumulative Unit Capability Factor:** 92.1%
Cumulative Energy Unavailability Factor: 7.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	1970.9	1128	100.0	100.0	100.0	100.0	47.5	47.5	2310	62.9
1988	6357.9	1112	95.9	97.1	95.9	97.1	65.1	59.8	8419	95.8
1989	6069.5	1105	79.5	89.9	79.5	89.9	62.7	61.0	6981	79.7
1990	6052.7	1105	75.0	85.5	75.0	85.5	62.5	61.5	6598	75.3
1991	8772.7	1105	96.9	88.1	96.9	88.1	90.6	68.0	8489	96.9
1992	7000.3	1105	79.8	86.6	79.8	86.6	72.1	68.8	7027	80.0
1993	7622.5	1105	84.3	86.2	84.3	86.2	78.7	70.3	7399	84.5
1994	9504.2	1105	99.4	88.0	99.4	88.0	98.2	74.1	8704	99.4
1995	8183.8	1105	87.9	88.0	87.9	88.0	84.5	75.3	7710	88.0
1996	7830.6	1105	82.0	87.3	82.0	87.3	80.7	75.9	7225	82.3
1997	9102.9	1105	95.2	88.1	95.2	88.1	94.0	77.6	8344	95.3
1998	8592.8	1105	89.5	88.2	89.5	88.2	88.8	78.6	7855	89.7
1999	9174.1	1105	93.3	88.6	93.3	88.6	94.8	79.9	8182	93.4
2000	10005.4	1105	99.3	89.4	99.3	89.4	103.1	81.6	8724	99.3
2001	9826.7	1131	95.3	89.8	95.3	89.8	100.1	82.9	8353	95.4
2002	9537.6	1131	92.3	90.0	92.3	90.0	96.3	83.8	8119	92.7
2003	10298.7	1131	100.0	90.6	100.0	90.6	103.9	85.1	8760	100.0
2004	9623.2	1125	95.0	90.9	95.0	90.9	97.2	85.8	8360	95.2
2005	9521.0	1162	95.1	91.1	95.1	91.1	93.5	86.2	8328	95.1
2006	10158.7	1136	100.0	91.6	100.0	91.6	102.1	87.0	8760	100.0
2007	8828.6	1136	88.3	91.4	88.3	91.4	88.7	87.1	7736	88.3
2008	9624.2	1136	94.9	91.6	94.9	91.6	96.4	87.6	8339	94.9
2009	10108.9	1136	100.0	92.0	100.0	92.0	101.6	88.2	8760	100.0
2010	9518.4	1136	94.8	92.1	94.8	92.1	95.6	88.5	8300	94.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				7	71	
C. Inspection, maintenance or repair combined with refuelling	459			552		
D. Inspection, maintenance or repair without refuelling				30		
H. Nuclear regulatory requirements					11	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Subtotal	459	0	0	589	89	0
Total		459			678	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		5
15. Reactor Cooling Systems		9
16. Steam generation systems		17
17. Safety I&C Systems (excluding reactor I&C)		3
21. Fuel Handling and Storage Facilities		2
32. Feedwater and Main Steam System		3
35. All other I&C Systems		2
41. Main Generator Systems		8
42. Electrical Power Supply Systems		0
Total	0	49

US-483 CALLAWAY-1

Operator: AmerenUE (AMEREN UE, Union Electric Company)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1190.0 MW(e)
Design Net Capacity: 1171.0 MW(e)
Design Discharge Burnup: 42000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9011.0 GW(e).h
Energy Availability Factor: 84.6%
Load Factor: 86.4%
Operating Factor: 84.6%
Energy Unavailability Factor: 15.4%
Total Off-line Time: 1348 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	927.9	836.9	918.2	464.0	0.0	490.6	889.8	890.8	872.6	908.1	889.4	922.8	9011.0
EAF (%)	100.0	100.0	100.0	53.3	0.0	63.1	100.0	100.0	100.0	100.0	100.0	100.0	84.6
UCF (%)	100.0	100.0	100.0	53.3	0.0	63.1	100.0	100.0	100.0	100.0	100.0	100.0	84.6
LF (%)	104.8	104.7	103.8	54.2	0.0	57.3	100.5	100.6	101.8	102.6	103.7	104.2	86.4
OF (%)	100.0	100.0	100.0	53.8	0.0	62.4	100.0	100.0	100.0	100.0	100.0	100.0	84.6
EUf (%)	0.0	0.0	0.0	46.7	100.0	36.9	0.0	0.0	0.0	0.0	0.0	0.0	15.4
PUf (%)	0.0	0.0	0.0	46.7	100.0	36.9	0.0	0.0	0.0	0.0	0.0	0.0	15.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Jan 1975
Date of First Criticality: 10 Feb 1984
Date of Grid Connection: 24/10/1984
Date of Commercial Operation: 19/12/1984

Lifetime Generation: 226769.4 GW(e).h
Cumulative Energy Availability Factor: 88.3%
Cumulative Load Factor: 87.3%
Cumulative Unit Capability Factor: 88.3%
Cumulative Energy Unavailability Factor: 11.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	323.0	1140	100.0	100.0	100.0	100.0	90.0	90.0	303	100.0
1985	8045.8	1120	90.0	90.3	90.0	90.3	82.0	82.3	7882	90.0
1986	7199.1	1120	81.6	86.0	81.6	86.0	73.4	77.9	7121	81.3
1987	6321.8	1120	70.0	80.8	70.0	80.8	64.4	73.5	6141	70.1
1988	8144.2	1120	92.5	83.7	92.5	83.7	82.8	75.8	7413	84.4
1989	8350.9	1118	84.0	83.8	84.0	83.8	85.3	77.7	7368	84.1
1990	8005.1	1125	81.8	83.4	81.8	83.4	81.2	78.3	7167	81.8
1991	9979.4	1125	99.6	85.7	99.6	85.7	101.3	81.5	8726	99.6
1992	8094.6	1125	82.0	85.3	82.0	85.3	81.9	81.6	7204	82.0
1993	8390.0	1120	85.5	85.3	85.5	85.3	85.5	82.0	7498	85.6
1994	10006.5	1115	99.6	86.7	99.6	86.7	102.4	84.0	8726	99.6
1995	8252.8	1125	84.0	86.5	84.0	86.5	83.7	84.0	7356	84.0
1996	8890.4	1125	89.6	86.7	89.6	86.7	90.0	84.5	7864	89.5
1997	8954.6	1125	100.0	87.8	100.0	87.8	90.9	85.0	8760	100.0
1998	8516.8	1125	90.4	87.9	90.4	87.9	86.4	85.1	7913	90.3
1999	8596.4	1125	87.8	87.9	87.8	87.9	87.2	85.2	7707	88.0
2000	9991.8	1125	100.0	88.7	99.7	88.7	101.1	86.2	8762	99.7
2001	8384.1	1125	85.4	88.5	85.4	88.5	85.1	86.2	7500	85.6
2002	8386.6	1125	85.2	88.3	85.2	88.3	85.1	86.1	7484	85.4
2003	9699.7	1125	95.8	88.7	95.8	88.7	98.4	86.8	8397	95.9
2004	7842.4	1125	77.9	88.2	77.9	88.2	79.4	86.4	6856	78.1
2005	8021.2	1137	79.6	87.7	79.6	87.7	80.5	86.1	6966	79.5
2006	10098.9	1190	95.0	88.1	95.0	88.1	96.9	86.6	8324	95.0
2007	9372.0	1190	88.4	88.1	88.4	88.1	89.9	86.8	7742	88.4
2008	9378.2	1190	89.2	88.2	89.2	88.1	89.7	86.9	7834	89.2
2009	10247.1	1190	96.0	88.5	96.0	88.5	98.3	87.4	8408	96.0
2010	9011.0	1190	84.6	88.3	84.6	88.3	86.4	87.3	7412	84.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					165	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling	1346			668		
D. Inspection, maintenance or repair without refuelling				81	1	
E. Testing of plant systems or components				0		
H. Nuclear regulatory requirements					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	0
L. Human factor related					1	
Z. Others					1	
Subtotal	1346	0	0	749	180	0
Total		1346			929	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		9
14. Safety Systems		1
15. Reactor Cooling Systems		13
16. Steam generation systems		4
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		30
32. Feedwater and Main Steam System		35
33. Circulating Water System		13
35. All other I&C Systems		2
41. Main Generator Systems		9
42. Electrical Power Supply Systems		29
XX. Miscellaneous Systems		6
Total	0	152

US-317 CALVERT CLIFFS-1

Operator: CONSTELL (CONSTELLATION Energy Nuclear Group, LLC)
Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 855.0 MW(e)
Design Net Capacity: 845.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6755.0 GW(e).h
Energy Availability Factor: 89.0%
Load Factor: 90.2%
Operating Factor: 89.2%
Energy Unavailability Factor: 11.0%
Total Off-line Time: 946 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	658.8	369.1	157.7	632.7	509.0	615.2	627.0	624.6	612.2	650.6	636.5	661.7	6755.0
EAF (%)	100.0	58.0	30.1	100.0	78.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.0
UCF (%)	100.0	58.0	30.1	100.0	78.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.0
LF (%)	103.6	64.2	24.8	102.8	80.0	99.9	98.6	98.2	99.5	102.3	103.3	104.0	90.2
OF (%)	100.0	61.9	28.5	100.0	78.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.2
EUf (%)	0.0	42.0	69.9	0.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0
PUf (%)	0.0	29.2	69.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
UCLF (%)	0.0	12.9	0.0	0.0	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1968
Date of First Criticality: 10 Jul 1974
Date of Grid Connection: 01 Mar 1975
Date of Commercial Operation: 05 Aug 1975

Lifetime Generation: 205425.2 GW(e).h
Cumulative Energy Availability Factor: 78.1%
Cumulative Load Factor: 78.7%
Cumulative Unit Capability Factor: 78.4%
Cumulative Energy Unavailability Factor: 21.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	3641.1	800	77.2	77.2	77.2	77.2	77.4	77.4	4807	81.8
1976	6303.9	800	89.7	84.7	89.7	84.7	89.7	84.8	8356	95.1
1977	4882.0	807	68.6	78.6	68.6	78.6	69.1	78.9	6313	72.1
1978	4676.1	810	65.9	75.2	65.9	75.2	65.9	75.3	6150	70.2
1979	4194.1	810	59.1	71.7	59.1	71.7	59.1	71.8	6154	70.3
1980	4542.5	810	77.0	72.6	72.2	71.8	63.8	70.4	6349	72.3
1981	6109.6	821	86.4	74.7	86.4	74.0	85.0	72.6	7544	86.1
1982	5362.1	825	73.9	74.6	73.9	74.0	74.2	72.8	6419	73.3
1983	5570.7	825	77.0	74.9	77.0	74.4	77.1	73.3	6719	76.7
1984	6221.6	825	86.7	76.1	84.3	75.4	85.9	74.6	7422	84.5
1985	4359.7	825	58.8	74.5	58.8	73.8	60.3	73.3	5186	59.2
1986	5830.7	825	78.2	74.8	78.2	74.2	80.7	73.9	6855	78.3
1987	5268.5	825	70.9	74.5	70.9	73.9	72.9	73.8	6233	71.2
1988	5164.2	825	71.0	74.2	71.0	73.7	71.3	73.7	6263	71.3
1989	1345.6	825	18.8	70.4	18.8	69.9	18.6	69.9	1727	19.7
1990	1344.4	825	20.1	67.2	20.1	66.7	18.6	66.6	1840	21.0
1991	5465.3	825	75.5	67.7	75.5	67.3	75.6	67.1	6638	75.8
1992	4113.9	825	55.6	67.0	55.6	66.6	56.8	66.5	4927	56.1
1993	7334.9	827	98.2	68.7	98.2	68.3	101.2	68.4	8599	98.2
1994	4686.4	832	64.6	68.5	64.6	68.1	64.2	68.2	5656	64.6
1995	7030.2	835	96.9	69.9	96.9	69.5	96.1	69.6	8487	96.9
1996	4846.9	835	65.7	69.7	65.7	69.3	66.1	69.4	5762	65.6
1997	7158.4	835	95.9	70.9	95.9	70.5	97.9	70.7	8400	95.9
1998	6116.8	835	82.0	71.3	82.0	71.0	83.6	71.2	7184	82.0
1999	6994.3	835	96.8	72.4	94.0	72.0	95.6	72.2	8231	94.0
2000	6449.6	827	86.2	72.9	86.2	72.5	88.7	72.9	7580	86.3
2001	7454.8	825	99.6	73.9	99.6	73.5	103.2	74.0	8727	99.6
2002	4645.2	825	62.8	73.5	62.8	73.2	64.3	73.7	5506	62.9
2003	7532.5	825	100.0	74.4	100.0	74.1	104.2	74.7	8760	100.0
2004	6974.0	870	91.5	75.0	91.5	74.7	93.3	75.4	8034	91.5
2005	7626.3	845	99.6	75.9	99.6	75.5	103.0	76.3	8726	99.6
2006	6449.8	873	84.3	76.1	84.3	75.8	84.3	76.6	7386	84.3
2007	7545.4	873	99.3	76.9	99.3	76.6	98.7	77.3	8701	99.3
2008	7161.1	873	94.2	77.4	94.2	77.1	93.4	77.8	8275	94.2
2009	7528.6	873	98.9	78.1	98.9	77.8	98.4	78.4	8661	98.9
2010	6755.0	855	89.0	78.4	89.0	78.1	90.2	78.7	7814	89.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		243			280	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	701			926		
D. Inspection, maintenance or repair without refuelling				464		
E. Testing of plant systems or components				44		
H. Nuclear regulatory requirements					5	19
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					61	12
Subtotal	701	243	0	1434	353	31
Total		944			1818	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		10
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		25
14. Safety Systems		35
15. Reactor Cooling Systems	84	62
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		61
32. Feedwater and Main Steam System		45
33. Circulating Water System		1
35. All other I&C Systems		2
41. Main Generator Systems	158	2
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		0
Total	242	266

US-318 CALVERT CLIFFS-2

Operator: CONSTELL (CONSTELLATION Energy Nuclear Group, LLC)
Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 850.0 MW(e)
Design Net Capacity: 845.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7238.9 GW(e).h
Energy Availability Factor: 97.3%
Load Factor: 97.2%
Operating Factor: 97.4%
Energy Unavailability Factor: 2.7%
Total Off-line Time: 232 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	653.6	374.0	649.2	625.2	632.0	593.1	601.6	610.2	602.4	629.7	619.9	647.9	7238.9
EAF (%)	100.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.3
UCF (%)	100.0	65.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.3
LF (%)	103.4	65.5	102.8	102.2	99.9	96.9	95.1	96.5	98.4	99.6	101.2	102.5	97.2
OF (%)	100.0	65.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.4
EUAF (%)	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1968
Date of First Criticality: 30/11/1976
Date of Grid Connection: 12 Jul 1976
Date of Commercial Operation: 04 Jan 1977

Lifetime Generation: 202984.6 GW(e).h
Cumulative Energy Availability Factor: 81.8%
Cumulative Load Factor: 81.6%
Cumulative Unit Capability Factor: 81.9%
Cumulative Energy Unavailability Factor: 18.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	4541.5	810	100.0	100.0	100.0	100.0	85.0	85.0	5676	86.0
1978	5226.6	810	72.8	84.5	72.8	84.5	73.7	78.5	7129	81.4
1979	5489.0	812	76.6	81.6	76.6	81.6	77.2	78.0	6792	77.5
1980	6412.3	825	98.9	86.3	96.2	85.6	88.5	80.9	8425	95.9
1981	5416.0	825	80.1	85.0	80.1	84.4	74.9	79.6	7005	80.0
1982	5005.2	825	74.2	83.1	74.2	82.6	69.3	77.8	6496	74.2
1983	6113.1	825	86.4	83.6	86.4	83.2	84.6	78.8	7567	86.4
1984	5338.4	825	73.7	82.3	73.7	82.0	73.7	78.1	6502	74.0
1985	5608.0	825	77.4	81.7	77.4	81.4	77.6	78.1	6789	77.5
1986	7006.7	825	96.0	83.2	96.0	82.9	97.0	80.0	8405	95.9
1987	4832.0	825	66.3	81.6	66.3	81.4	66.9	78.8	5859	66.9
1988	6602.7	825	88.8	82.2	88.8	82.0	91.1	79.8	7813	88.9
1989	1448.5	825	18.3	77.2	18.3	77.0	20.0	75.1	1731	19.8
1990	0.0	825	0.0	71.6	0.0	71.4	0.0	69.7	0	0.0
1991	3635.6	825	51.3	70.2	51.3	70.0	50.3	68.3	4515	51.5
1992	6590.3	825	89.3	71.4	89.3	71.3	90.9	69.8	7855	89.4
1993	4975.2	827	67.4	71.2	67.4	71.0	68.6	69.7	5939	67.8
1994	6576.5	835	90.6	72.3	90.6	72.1	89.8	70.9	7925	90.5
1995	5911.1	840	81.4	72.8	81.4	72.6	80.3	71.4	7121	81.3
1996	7247.7	840	97.5	74.1	97.5	73.9	98.2	72.8	8561	97.5
1997	5979.9	840	81.1	74.4	81.1	74.3	81.3	73.2	7100	81.1
1998	7225.5	840	95.8	75.4	95.8	75.3	98.2	74.3	8393	95.8
1999	6332.7	840	84.5	75.8	84.5	75.7	86.1	74.9	7400	84.5
2000	7391.0	835	98.1	76.8	98.1	76.6	100.7	76.0	8614	98.1
2001	6201.5	835	83.3	77.0	83.3	76.9	84.8	76.3	7297	83.3
2002	7480.6	835	100.0	77.9	100.0	77.8	102.3	77.3	8760	100.0
2003	6156.9	835	81.4	78.0	81.4	77.9	84.2	77.6	7124	81.3
2004	7552.2	858	99.4	78.8	99.4	78.7	101.3	78.5	8729	99.4
2005	7114.3	858	94.2	79.4	94.2	79.3	94.6	79.1	8249	94.2
2006	7406.3	862	98.4	80.1	98.4	80.0	98.1	79.7	8621	98.4
2007	6807.8	862	90.2	80.4	90.2	80.3	90.2	80.1	7902	90.2
2008	7514.7	862	100.0	81.0	100.0	81.0	99.2	80.7	8784	100.0
2009	7021.5	862	93.9	81.4	93.9	81.4	93.0	81.1	8227	93.9
2010	7238.9	850	97.3	81.9	97.3	81.8	97.2	81.6	8528	97.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		231			214	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling				1205		
D. Inspection, maintenance or repair without refuelling				80		
E. Testing of plant systems or components				9	0	
H. Nuclear regulatory requirements					1	6
J. Grid limitation, failure or grid unavailability					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					11	
L. Human factor related					3	
Subtotal	0	231	0	1294	242	6
Total		231			1542	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		13
13. Reactor Auxiliary Systems		25
14. Safety Systems		1
15. Reactor Cooling Systems	231	64
16. Steam generation systems		2
31. Turbine and auxiliaries		25
32. Feedwater and Main Steam System		42
35. All other I&C Systems		2
41. Main Generator Systems		15
42. Electrical Power Supply Systems		17
Total	231	208

US-413 CATAWBA-1

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1129.0 MW(e)
 Design Net Capacity: 1145.0 MW(e)
 Design Discharge Burnup: 40200 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9889.1 GW(e).h
 Energy Availability Factor: 98.5%
 Load Factor: 100.0%
 Operating Factor: 98.5%
 Energy Unavailability Factor: 1.5%
 Total Off-line Time: 131 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	871.2	612.9	859.8	836.7	856.2	824.1	849.7	848.3	825.0	855.9	778.6	870.8	9889.1
EAF (%)	100.0	80.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.5
UCF (%)	100.0	80.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.5
LF (%)	103.7	80.8	102.5	102.9	101.9	101.4	101.2	101.0	101.5	101.9	95.7	103.7	100.0
OF (%)	100.0	80.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.5
EUF (%)	0.0	19.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	19.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Jan 1974
 Date of First Criticality: 01 Jul 1985
 Date of Grid Connection: 22/01/1985
 Date of Commercial Operation: 29/06/1985
 Lifetime Generation: 212020.9 GW(e).h
 Cumulative Energy Availability Factor: 84.7%
 Cumulative Load Factor: 83.9%
 Cumulative Unit Capability Factor: 84.7%
 Cumulative Energy Unavailability Factor: 15.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	3440.5	1138	78.8	78.8	78.8	78.8	67.3	67.3	3513	78.7
1986	5199.1	1145	58.9	65.6	58.9	65.6	51.8	57.1	5151	58.8
1987	6406.0	1145	68.0	66.6	68.0	66.6	63.9	59.8	5924	67.6
1988	7640.0	1129	79.8	70.3	79.8	70.3	77.0	64.6	7003	79.7
1989	7775.4	1129	84.7	73.4	84.7	73.4	78.6	67.7	7278	83.1
1990	6900.5	1129	71.7	73.1	71.7	73.1	69.8	68.1	6277	71.7
1991	6681.1	1129	71.1	72.8	71.1	72.8	67.6	68.0	6227	71.1
1992	7050.9	1129	72.1	72.7	72.1	72.7	71.1	68.4	6338	72.2
1993	7597.1	1129	79.0	73.5	79.0	73.5	76.8	69.4	6916	78.9
1994	9778.8	1129	99.6	76.2	99.6	76.2	98.9	72.5	8722	99.6
1995	8721.6	1129	88.1	77.3	88.1	77.3	88.2	74.0	7712	88.0
1996	6341.1	1129	66.2	76.4	66.2	76.4	63.9	73.1	5806	66.1
1997	9192.5	1129	90.7	77.5	90.7	77.5	92.9	74.7	7966	90.9
1998	8903.7	1129	90.5	78.5	90.5	78.5	90.0	75.8	7923	90.4
1999	9073.7	1129	91.2	79.3	91.2	79.3	91.7	76.9	7987	91.2
2000	8923.0	1129	89.3	80.0	89.3	80.0	90.0	77.8	7844	89.3
2001	9977.0	1129	99.6	81.2	99.6	81.2	100.9	79.2	8722	99.6
2002	9481.6	1129	94.2	81.9	94.2	81.9	95.9	80.1	8250	94.2
2003	8198.5	1129	81.7	81.9	81.7	81.9	82.9	80.3	7157	81.7
2004	9711.1	1129	98.0	82.7	98.0	82.7	97.9	81.2	8608	98.0
2005	9177.3	1129	91.7	83.1	91.7	83.1	92.8	81.7	8027	91.6
2006	8115.0	1129	80.7	83.0	80.7	83.0	82.1	81.7	7066	80.7
2007	10070.9	1129	99.6	83.8	99.6	83.8	101.8	82.6	8728	99.6
2008	8773.3	1129	86.6	83.9	86.6	83.9	88.5	82.9	7610	86.6
2009	9002.0	1129	89.5	84.1	89.5	84.1	91.0	83.2	7834	89.4
2010	9889.1	1129	98.5	84.7	98.5	84.7	100.0	83.9	8629	98.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		130		2	301	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling				925		
D. Inspection, maintenance or repair without refuelling				54		
E. Testing of plant systems or components				2	4	
H. Nuclear regulatory requirements					4	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				2	6	
Subtotal	0	130	0	985	321	0
Total		130			1306	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems		28
13. Reactor Auxiliary Systems		10
14. Safety Systems		22
15. Reactor Cooling Systems	130	98
16. Steam generation systems		0
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System		60
33. Circulating Water System		12
41. Main Generator Systems		11
42. Electrical Power Supply Systems		29
XX. Miscellaneous Systems		8
Total	130	298

US-414 CATAWBA-2

Operator: DUKEENER (DUKE ENERGY CORP.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1129.0 MW(e)
Design Net Capacity: 1145.0 MW(e)
Design Discharge Burnup: 40200 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9075.0 GW(e).h
Energy Availability Factor: 90.6%
Load Factor: 91.8%
Operating Factor: 90.6%
Energy Unavailability Factor: 9.4%
Total Off-line Time: 826 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	870.2	786.9	868.9	836.5	857.4	803.2	851.1	836.7	430.7	230.9	834.2	868.3	9075.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	56.7	31.0	100.0	100.0	90.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	56.7	31.1	100.0	100.0	90.6
LF (%)	103.6	103.7	103.6	102.9	102.1	98.8	101.3	99.6	53.0	27.5	102.5	103.4	91.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	57.2	30.4	100.0	100.0	90.6
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.3	69.0	0.0	0.0	9.4
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.3	69.0	0.0	0.0	9.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Jan 1974
Date of First Criticality: 05 Aug 1986
Date of Grid Connection: 18/05/1986
Date of Commercial Operation: 19/08/1986

Lifetime Generation: 203991.1 GW(e).h
Cumulative Energy Availability Factor: 85.4%
Cumulative Load Factor: 84.5%
Cumulative Unit Capability Factor: 85.4%
Cumulative Energy Unavailability Factor: 14.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	1324.2	1135	41.8	41.8	41.8	41.8	35.7	35.7	1325	40.9
1987	7169.5	1145	80.2	69.8	80.2	69.8	71.5	61.8	7014	80.1
1988	5435.0	1129	71.8	70.6	71.8	70.6	54.8	58.9	5571	63.4
1989	6527.1	1129	72.0	71.0	72.0	71.0	66.0	61.0	6302	71.9
1990	6503.0	1129	69.0	70.6	69.0	70.6	65.8	62.1	5984	68.3
1991	7274.9	1129	75.6	71.5	75.6	71.5	73.6	64.2	6621	75.6
1992	9273.5	1129	94.3	75.1	94.3	75.1	93.5	68.8	8281	94.3
1993	8177.4	1129	82.6	76.1	82.6	76.1	82.7	70.7	7233	82.6
1994	7691.7	1129	79.7	76.5	79.7	76.5	77.8	71.5	6978	79.7
1995	7960.2	1129	80.8	77.0	80.8	77.0	80.5	72.5	7074	80.8
1996	9233.6	1129	92.3	78.5	92.3	78.5	93.1	74.5	8107	92.3
1997	8593.4	1129	87.1	79.2	87.1	79.2	86.9	75.6	7623	87.0
1998	8672.3	1129	86.5	79.8	86.5	79.8	87.7	76.5	7580	86.5
1999	8855.4	1129	88.2	80.4	88.2	80.4	89.5	77.5	7727	88.2
2000	8981.4	1129	90.3	81.1	90.3	81.1	90.6	78.4	7928	90.3
2001	8574.1	1129	85.7	81.4	85.7	81.4	86.7	78.9	7507	85.7
2002	10172.3	1129	100.0	82.6	100.0	82.6	102.9	80.4	8760	100.0
2003	9318.2	1129	92.7	83.1	92.7	83.1	94.2	81.2	8117	92.7
2004	8835.7	1129	87.4	83.4	87.4	83.4	89.1	81.6	7672	87.3
2005	10099.1	1129	99.7	84.2	99.7	84.2	102.1	82.7	8737	99.7
2006	8779.2	1129	87.9	84.4	87.9	84.4	88.8	83.0	7696	87.9
2007	8351.6	1129	82.9	84.3	82.9	84.3	84.4	83.1	7262	82.9
2008	10203.2	1129	100.0	85.0	100.0	85.0	102.9	83.9	8784	100.0
2009	8910.2	1129	88.2	85.2	88.2	85.2	90.1	84.2	7727	88.2
2010	9075.0	1129	90.6	85.4	90.6	85.4	91.8	84.5	7934	90.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				14	385	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	825			737		
D. Inspection, maintenance or repair without refuelling				56	0	
E. Testing of plant systems or components				3	1	
H. Nuclear regulatory requirements					4	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	10	
Subtotal	825	0	0	810	401	0
Total		825			1211	

7. Equipment Related Full Outages, Analysis by System

System	2010	1986 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		24
14. Safety Systems		8
15. Reactor Cooling Systems		46
16. Steam generation systems		4
17. Safety I&C Systems (excluding reactor I&C)		13
31. Turbine and auxiliaries		60
32. Feedwater and Main Steam System		83
41. Main Generator Systems		115
42. Electrical Power Supply Systems		35
XX. Miscellaneous Systems		0
Total	0	393

US-461 CLINTON-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1065.0 MW(e)
 Design Net Capacity: 950.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8612.0 GW(e).h
 Energy Availability Factor: 92.5%
 Load Factor: 92.3%
 Operating Factor: 92.3%
 Energy Unavailability Factor: 7.5%
 Total Off-line Time: 671 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	229.8	507.3	801.0	776.3	796.7	769.3	791.4	790.5	769.1	801.3	777.3	801.9	8612.0
EAF (%)	33.7	75.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.5
UCF (%)	33.7	75.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.5
LF (%)	29.0	70.9	101.2	101.2	100.6	100.3	99.9	99.8	100.3	101.1	101.2	101.2	92.3
OF (%)	32.3	75.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.3
EUf (%)	66.3	24.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5
PUf (%)	66.3	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
UCLF (%)	0.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1975
 Date of First Criticality: 27/02/1987
 Date of Grid Connection: 24/04/1987
 Date of Commercial Operation: 24/11/1987
 Lifetime Generation: 145690.8 GW(e).h
 Cumulative Energy Availability Factor: 76.4%
 Cumulative Load Factor: 73.5%
 Cumulative Unit Capability Factor: 76.5%
 Cumulative Energy Unavailability Factor: 23.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	684.1	932	100.0	100.0	100.0	100.0	50.1	50.1	898	61.3
1988	5860.7	930	82.5	85.0	82.5	85.0	71.7	68.6	7244	82.5
1989	2861.9	931	45.1	66.6	45.1	66.6	35.1	53.2	3947	45.1
1990	3596.6	930	52.6	62.2	52.6	62.2	44.1	50.3	4604	52.6
1991	6048.0	930	79.1	66.2	79.1	66.2	74.2	56.1	6927	79.1
1992	4935.3	930	66.3	66.3	66.3	66.3	60.4	56.9	5824	66.3
1993	5879.2	930	77.1	68.0	77.1	68.0	72.2	59.4	6750	77.1
1994	7410.3	930	93.8	71.6	93.8	71.6	91.0	63.8	8217	93.8
1995	6109.2	930	81.6	72.8	81.6	72.8	75.0	65.1	7140	81.5
1996	5312.9	930	66.5	72.1	66.5	72.1	65.0	65.1	5833	66.4
1997	0.0	930	0.0	65.1	0.0	65.0	0.0	58.7	0	0.0
1998	0.0	930	0.0	59.2	0.0	59.2	0.0	53.5	0	0.0
1999	4704.2	930	60.2	59.3	60.2	59.3	57.7	53.8	5270	60.2
2000	6888.8	930	85.9	61.3	85.9	61.3	84.3	56.1	7542	85.9
2001	7877.2	930	97.8	63.9	97.8	63.9	96.7	59.0	8565	97.8
2002	7657.5	1022	89.8	65.7	89.8	65.7	88.8	61.1	7805	89.1
2003	8700.8	1022	98.6	67.9	98.6	67.9	97.2	63.5	8634	98.6
2004	8000.4	1022	91.5	69.4	90.0	69.3	89.1	65.1	7911	90.1
2005	8688.7	1026	97.0	71.0	97.0	71.0	96.7	67.0	8497	97.0
2006	8233.3	1052	91.1	72.2	91.1	72.1	89.3	68.3	7974	91.0
2007	9250.4	1043	99.5	73.7	99.5	73.6	101.2	70.1	8714	99.5
2008	8546.5	1043	92.9	74.7	92.9	74.6	93.3	71.3	8160	92.9
2009	8887.9	1043	95.8	75.7	95.8	75.6	97.3	72.5	8390	95.8
2010	8612.0	1065	92.5	76.5	92.5	76.4	92.3	73.5	8089	92.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		64			329	
B. Refuelling without a maintenance					17	
C. Inspection, maintenance or repair combined with refuelling	605			1536		
D. Inspection, maintenance or repair without refuelling				173		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements					8	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					51	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						5
Subtotal	605	64	0	1711	405	5
Total		669			2121	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		21
14. Safety Systems		8
15. Reactor Cooling Systems		87
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries	64	38
32. Feedwater and Main Steam System		28
41. Main Generator Systems		6
42. Electrical Power Supply Systems		21
Total	64	210

US-397 COLUMBIA

Operator: ENERGYNW (Energy Northwest)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1131.0 MW(e)
 Design Net Capacity: 1100.0 MW(e)
 Design Discharge Burnup: 42000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9241.1 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 93.3%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	807.7	742.8	782.2	782.7	806.0	567.6	765.2	770.5	791.5	819.3	797.7	808.1	9241.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	96.0	97.7	93.1	96.1	95.8	69.7	90.9	91.6	97.2	97.4	97.8	96.0	93.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1972
 Date of First Criticality: 19/01/1984
 Date of Grid Connection: 27/05/1984
 Date of Commercial Operation: 13/12/1984
 Lifetime Generation: 183936.9 GW(e).h
 Cumulative Energy Availability Factor: 78.5%
 Cumulative Load Factor: 72.4%
 Cumulative Unit Capability Factor: 79.2%
 Cumulative Energy Unavailability Factor: 21.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	410.4	1104	90.5	90.5	90.5	90.5	84.6	84.6	399	90.7
1985	5176.4	1100	77.1	77.7	77.1	77.7	53.7	55.2	6624	75.6
1986	5183.2	1095	74.1	76.0	74.1	76.0	54.0	54.6	6133	70.0
1987	5398.0	1095	67.9	73.3	67.9	73.3	56.3	55.2	5979	68.3
1988	6000.4	1095	68.2	72.1	68.2	72.1	62.4	56.9	6020	68.5
1989	6127.9	1095	76.1	72.9	76.1	72.9	63.9	58.3	6680	76.3
1990	5791.3	1095	65.3	71.6	65.3	71.6	60.4	58.7	5752	65.7
1991	4272.5	1090	47.1	68.2	47.1	68.2	44.7	56.7	4194	47.9
1992	5705.4	1085	62.0	67.4	62.0	67.4	59.9	57.1	5505	62.7
1993	7142.0	1107	77.2	68.5	77.2	68.5	73.6	58.9	6757	77.1
1994	6753.8	1086	73.7	69.0	73.7	69.0	71.0	60.1	6500	74.2
1995	6948.0	1091	76.0	69.6	76.0	69.6	72.7	61.3	6680	76.3
1996	5562.6	1106	79.7	70.5	68.3	69.5	57.2	60.9	5999	68.3
1997	6129.9	1107	77.4	71.0	71.3	69.7	63.2	61.1	6248	71.3
1998	6922.8	1107	72.8	71.1	72.8	69.9	71.4	61.8	6373	72.8
1999	6099.7	1107	68.5	71.0	68.5	69.8	62.9	61.9	6018	68.7
2000	8605.2	1107	95.4	72.5	95.4	71.4	88.5	63.6	8385	95.5
2001	8257.7	1107	86.1	73.3	86.1	72.3	85.2	64.9	7553	86.2
2002	8981.3	1107	97.4	74.6	97.4	73.7	92.6	66.4	8528	97.4
2003	7614.9	1107	80.4	74.9	80.4	74.0	78.5	67.0	7039	80.4
2004	8981.6	1107	93.6	75.9	93.6	75.0	92.4	68.3	8222	93.6
2005	8242.3	1108	86.1	76.4	86.1	75.5	84.9	69.1	7537	86.0
2006	9328.3	1131	97.8	77.4	97.8	76.6	94.2	70.3	8568	97.8
2007	8108.6	1131	85.4	77.7	85.4	77.0	81.8	70.8	7481	85.4
2008	9269.6	1131	97.8	78.6	97.8	77.9	93.3	71.7	8592	97.8
2009	6634.0	1131	72.9	78.4	72.9	77.7	67.0	71.6	6382	72.9
2010	9241.1	1131	100.0	79.2	100.0	78.5	93.3	72.4	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					310	
B. Refuelling without a maintenance					14	
C. Inspection, maintenance or repair combined with refuelling				1049		
D. Inspection, maintenance or repair without refuelling				115		
E. Testing of plant systems or components				24	0	
H. Nuclear regulatory requirements					38	
J. Grid limitation, failure or grid unavailability						56
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				69	126	
L. Human factor related					4	
Subtotal	0	0	0	1257	492	56
Total		0			1805	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		2
14. Safety Systems		16
15. Reactor Cooling Systems		30
17. Safety I&C Systems (excluding reactor I&C)		27
21. Fuel Handling and Storage Facilities		14
31. Turbine and auxiliaries		93
32. Feedwater and Main Steam System		39
35. All other I&C Systems		5
41. Main Generator Systems		2
42. Electrical Power Supply Systems		72
Total	0	305

US-445 COMANCHE PEAK-1

Operator: LUMINANT (Luminant Generation Company LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1209.0 MW(e)
Design Net Capacity: 1150.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9676.7 GW(e).h
Energy Availability Factor: 92.2%
Load Factor: 91.4%
Operating Factor: 92.2%
Energy Unavailability Factor: 7.8%
Total Off-line Time: 686 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	649.0	825.7	912.2	144.1	909.5	874.4	899.9	895.8	871.4	897.8	883.4	913.6	9676.7
EAFF (%)	85.7	100.0	100.0	19.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.2
UCF (%)	85.7	100.0	100.0	19.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.2
LF (%)	72.1	101.6	101.5	16.5	101.1	100.5	100.0	99.6	100.1	99.8	101.3	101.6	91.4
OF (%)	85.6	100.0	100.0	19.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.2
EUFF (%)	14.3	0.0	0.0	80.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.8
PUFF (%)	9.2	0.0	0.0	80.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4
UCLF (%)	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/12/1974
Date of First Criticality: 04 Mar 1990
Date of Grid Connection: 24/04/1990
Date of Commercial Operation: 13/08/1990

Lifetime Generation: 176913.2 GW(e).h
Cumulative Energy Availability Factor: 89.2%
Cumulative Load Factor: 85.3%
Cumulative Unit Capability Factor: 89.2%
Cumulative Energy Unavailability Factor: 10.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	2513.5	1140	80.6	80.6	80.6	80.6	60.2	60.2	2865	78.0
1991	5360.5	1150	60.5	66.4	60.5	66.4	53.2	55.3	5341	61.0
1992	6937.5	1150	79.1	71.7	79.1	71.7	68.7	60.8	6947	79.1
1993	7150.4	1150	79.1	73.9	79.1	73.9	71.0	63.8	6932	79.1
1994	9367.6	1150	98.8	79.5	98.8	79.5	93.0	70.4	8653	98.8
1995	7803.7	1150	85.0	80.5	85.0	80.5	77.5	71.7	7444	85.0
1996	7756.2	1150	83.0	80.9	82.7	80.9	76.8	72.5	7265	82.7
1997	9478.9	1150	98.8	83.3	98.8	83.3	94.1	75.4	8656	98.8
1998	8506.0	1150	89.6	84.1	89.6	84.0	84.4	76.5	7848	89.6
1999	8601.5	1150	90.4	84.7	90.4	84.7	85.4	77.4	7922	90.4
2000	9619.8	1150	100.0	86.2	100.0	86.2	95.2	79.1	8784	100.0
2001	8444.3	1150	88.9	86.4	88.9	86.4	83.8	79.5	7781	88.8
2002	7785.3	1150	83.0	86.2	83.0	86.1	77.3	79.4	7213	82.3
2003	9626.0	1150	98.9	87.1	98.9	87.1	95.6	80.6	8653	98.8
2004	9018.1	1150	89.8	87.3	89.8	87.3	89.3	81.2	7877	89.7
2005	9217.8	1084	91.4	87.5	91.4	87.5	97.1	82.2	8004	91.4
2006	10298.0	1150	100.0	88.3	100.0	88.3	102.2	83.4	8760	100.0
2007	8596.7	1150	84.9	88.1	84.9	88.1	85.3	83.5	7437	84.9
2008	9658.7	1209	94.1	88.4	94.1	88.4	94.8	84.1	8262	94.1
2009	10640.9	1209	100.0	89.1	100.0	89.1	100.5	85.0	8760	100.0
2010	9676.7	1209	92.2	89.2	92.2	89.2	91.4	85.3	8074	92.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		37			138	
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling	578			664		
D. Inspection, maintenance or repair without refuelling	68			107		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	1
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					3	
Subtotal	646	37	0	771	159	1
Total		683			931	

7. Equipment Related Full Outages, Analysis by System

System	2010	1990 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		0
15. Reactor Cooling Systems		5
16. Steam generation systems		8
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		14
35. All other I&C Systems		8
41. Main Generator Systems		17
42. Electrical Power Supply Systems	37	19
Total	37	122

US-446 COMANCHE PEAK-2

Operator: LUMINANT (Luminant Generation Company LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1158.0 MW(e)
Design Net Capacity: 1150.0 MW(e)
Design Discharge Burnup: 36000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10531.7 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 103.8%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	902.0	818.9	904.6	866.2	899.5	833.0	888.6	884.5	861.7	896.5	871.9	904.3	10531.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	104.7	105.2	105.1	103.9	104.4	99.9	103.1	102.7	103.3	104.1	104.4	105.0	103.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/12/1974
Date of First Criticality: 24/03/1993
Date of Grid Connection: 04 Sep 1993
Date of Commercial Operation: 08 Mar 1993
Lifetime Generation: 156531.1 GW(e).h
Cumulative Energy Availability Factor: 91.3%
Cumulative Load Factor: 88.8%
Cumulative Unit Capability Factor: 91.3%
Cumulative Energy Unavailability Factor: 8.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1993	3441.8	1150	89.7	89.7	89.7	89.7	82.8	82.8	3245	89.7
1994	5263.2	1150	65.1	72.3	65.1	72.3	52.2	61.2	5697	65.0
1995	9166.6	1150	95.7	82.0	95.7	82.0	91.0	73.5	8382	95.7
1996	7370.4	1150	79.4	81.2	78.7	81.0	73.0	73.4	6911	78.7
1997	8062.1	1150	86.2	82.4	86.2	82.2	80.0	74.9	7554	86.2
1998	9345.3	1150	99.8	85.6	99.8	85.4	92.8	78.2	8741	99.8
1999	8756.0	1150	90.2	86.3	90.2	86.2	86.9	79.5	7901	90.2
2000	8868.0	1150	90.2	86.8	90.2	86.7	87.8	80.7	7927	90.2
2001	9877.9	1150	99.7	88.4	99.7	88.3	98.1	82.7	8731	99.7
2002	8793.8	1150	90.1	88.5	90.1	88.5	87.3	83.2	7888	90.0
2003	8123.4	1150	83.8	88.1	83.8	88.0	80.6	83.0	7307	83.4
2004	10038.9	1150	100.0	89.1	100.0	89.1	99.4	84.4	8784	100.0
2005	9225.4	1124	91.1	89.3	91.1	89.2	93.7	85.1	7979	91.1
2006	9598.2	1150	94.3	89.7	94.3	89.6	95.3	85.9	8260	94.3
2007	10249.0	1150	100.0	90.4	100.0	90.3	101.7	87.0	8760	100.0
2008	9575.9	1150	93.8	90.6	93.8	90.6	94.8	87.5	8241	93.8
2009	9500.6	1158	93.2	90.8	93.2	90.7	93.7	87.9	8155	93.1
2010	10531.7	1158	100.0	91.3	100.0	91.3	103.8	88.8	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1993 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure						165
B. Refuelling without a maintenance						0
C. Inspection, maintenance or repair combined with refuelling				498		
D. Inspection, maintenance or repair without refuelling				71		
E. Testing of plant systems or components				57		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				11	3	3
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					19	
Z. Others						0
Subtotal	0	0	0	637	187	3
Total		0			827	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1993 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		1
13. Reactor Auxiliary Systems		1
14. Safety Systems		38
15. Reactor Cooling Systems		51
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		41
41. Main Generator Systems		5
42. Electrical Power Supply Systems		3
Total	0	158

US-298 COOPER

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 774.0 MW(e)
 Design Net Capacity: 778.0 MW(e)
 Design Discharge Burnup: 17349 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6792.9 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 100.2%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	564.8	524.0	577.9	561.8	578.1	522.6	574.9	571.8	566.0	589.3	570.7	591.0	6792.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	98.1	100.7	100.5	100.8	100.4	93.8	99.8	99.3	101.6	102.3	102.3	102.6	100.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1968
 Date of First Criticality: 21/02/1974
 Date of Grid Connection: 05 Oct 1974
 Date of Commercial Operation: 07 Jan 1974
 Lifetime Generation: 175950.3 GW(e).h
 Cumulative Energy Availability Factor: 76.3%
 Cumulative Load Factor: 71.9%
 Cumulative Unit Capability Factor: 76.3%
 Cumulative Energy Unavailability Factor: 23.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1740.5	778	100.0	100.0	100.0	100.0	50.7	50.7	3240	73.4
1975	3363.2	764	50.3	67.2	50.3	67.2	50.3	50.4	7320	83.6
1976	3642.6	764	54.3	62.0	54.3	62.0	54.3	51.9	6626	75.4
1977	4540.1	764	67.9	63.7	67.9	63.7	67.8	56.5	7546	86.1
1978	4886.8	764	73.0	65.8	73.0	65.8	73.0	60.1	7966	90.9
1979	4995.0	764	74.6	67.4	74.6	67.4	74.6	62.8	7670	87.6
1980	3787.5	764	71.6	68.0	70.6	67.9	56.4	61.8	6240	71.0
1981	3851.1	764	71.0	68.4	71.0	68.3	57.5	61.2	6239	71.2
1982	5276.1	764	84.4	70.3	84.4	70.2	78.8	63.3	7412	84.6
1983	3343.3	764	62.7	69.5	62.7	69.4	50.0	61.9	5544	63.3
1984	3470.0	764	67.6	69.3	67.1	69.2	51.7	60.9	5901	67.2
1985	1067.7	764	20.1	65.1	20.1	64.9	16.0	57.0	1884	21.5
1986	4052.1	764	74.7	65.8	74.7	65.7	60.5	57.3	6546	74.7
1987	5522.1	764	94.6	68.0	94.6	67.8	82.5	59.2	8291	94.6
1988	4200.6	764	66.5	67.8	66.5	67.7	62.6	59.4	5887	67.0
1989	4790.9	764	74.9	68.3	74.9	68.2	71.6	60.2	6594	75.3
1990	5111.4	764	78.5	68.9	78.5	68.8	76.4	61.2	6908	78.9
1991	4803.8	764	77.9	69.4	77.9	69.3	71.8	61.8	6830	78.0
1992	6227.9	764	96.0	70.9	96.0	70.8	92.8	63.4	8436	96.0
1993	3712.9	764	56.8	70.1	56.8	70.1	55.5	63.0	5041	57.5
1994	2227.3	764	33.4	68.4	33.4	68.3	33.3	61.6	3033	34.6
1995	4127.8	764	64.0	68.2	64.0	68.1	61.7	61.6	5663	64.6
1996	6338.9	764	97.2	69.5	97.2	69.4	94.5	63.1	8540	97.2
1997	5455.7	764	83.6	70.1	83.6	70.0	81.5	63.8	7336	83.7
1998	4869.9	764	74.4	70.2	74.4	70.2	72.8	64.2	6544	74.7
1999	6510.4	764	97.7	71.3	97.7	71.2	97.3	65.5	8563	97.8
2000	4735.9	764	73.1	71.4	73.1	71.3	70.6	65.7	6414	73.0
2001	5206.5	764	79.9	71.7	79.9	71.6	77.8	66.1	7009	80.0
2002	6318.2	764	96.8	72.6	96.8	72.5	94.4	67.1	8478	96.8
2003	4492.3	764	71.3	72.5	71.3	72.5	67.1	67.1	6236	71.2
2004	6171.8	764	94.6	73.3	94.6	73.2	92.0	67.9	8299	94.5
2005	5891.9	757	88.8	73.7	88.8	73.7	88.8	68.6	7774	88.7
2006	5910.5	760	89.3	74.2	89.3	74.2	88.8	69.2	7823	89.3
2007	6671.2	758	99.1	75.0	99.1	74.9	100.5	70.1	8685	99.1
2008	5964.1	770	89.1	75.4	89.1	75.3	88.5	70.7	7825	89.1
2009	5734.6	769	85.5	75.7	85.5	75.6	85.1	71.1	7494	85.5
2010	6792.9	774	100.0	76.3	100.0	76.3	100.2	71.9	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				3	205	1
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling				1215		
D. Inspection, maintenance or repair without refuelling				133		
E. Testing of plant systems or components				0	1	
H. Nuclear regulatory requirements				4	6	4
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					216	0
P. Fire					3	
Subtotal	0	0	0	1355	439	7
Total		0			1801	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		21
14. Safety Systems		7
15. Reactor Cooling Systems		12
31. Turbine and auxiliaries		97
32. Feedwater and Main Steam System		12
35. All other I&C Systems		6
41. Main Generator Systems		7
42. Electrical Power Supply Systems		11
XX. Miscellaneous Systems		10
Total	0	193

US-302 CRYSTAL RIVER-3

Operator: PROGRESS (PROGRESS ENERGY)
 Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP at the beginning of 2010): 860.0 MW(e)
 Design Net Capacity: 825.0 MW(e)
 Design Discharge Burnup: 36000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 0.0 GW(e).h
 Energy Availability Factor: 0.0%
 Load Factor: 0.0%
 Operating Factor: 0.0%
 Energy Unavailability Factor: 100.0%
 Total Off-line Time: 8760 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EAF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PUF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/09/1968
 Date of First Criticality: 14/01/1977
 Date of Grid Connection: 30/01/1977
 Date of Commercial Operation: 13/03/1977

Lifetime Generation: 167545.7 GW(e).h
 Cumulative Energy Availability Factor: 70.6%
 Cumulative Load Factor: 68.7%
 Cumulative Unit Capability Factor: 70.7%
 Cumulative Energy Unavailability Factor: 29.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	4037.7	818	67.2	67.2	67.2	67.2	67.2	67.2	5916	80.6
1978	2603.0	797	37.3	51.1	37.3	51.1	37.3	51.1	3627	41.4
1979	3761.8	797	53.9	52.1	53.9	52.1	53.9	52.1	5153	58.8
1980	3353.5	785	51.7	52.0	51.7	52.0	48.6	51.2	4663	53.1
1981	4083.7	782	62.8	54.2	62.4	54.1	59.6	52.9	5444	62.1
1982	4915.7	806	76.1	58.0	76.1	57.9	69.6	55.8	6651	75.9
1983	3772.3	806	59.1	58.2	59.1	58.1	53.4	55.5	5149	58.8
1984	6478.9	821	94.6	62.9	94.5	62.9	89.8	60.0	8295	94.4
1985	2863.6	821	48.2	61.2	48.2	61.2	39.8	57.6	4171	47.6
1986	2653.2	821	42.3	59.3	42.3	59.2	36.9	55.5	3659	41.8
1987	3620.8	821	60.2	59.4	60.2	59.3	50.3	55.0	5263	60.1
1988	5768.1	821	84.1	61.5	84.1	61.4	80.0	57.1	7375	84.0
1989	2930.0	821	48.4	60.5	48.4	60.4	40.7	55.9	4190	47.8
1990	4142.9	821	62.3	60.6	62.3	60.6	57.6	56.0	5421	61.9
1991	5457.2	821	82.2	62.1	81.5	62.0	75.9	57.3	7136	81.5
1992	5315.9	821	75.9	63.0	75.9	62.9	73.7	58.4	6633	75.5
1993	6080.0	821	84.8	64.3	84.8	64.2	84.5	60.0	7409	84.6
1994	5939.9	818	83.4	65.4	83.4	65.3	82.8	61.2	7292	83.2
1995	7234.9	818	99.7	67.2	99.7	67.1	101.0	63.4	8733	99.7
1996	2417.4	818	35.9	65.6	35.9	65.5	33.6	61.9	3107	35.4
1997	0.0	818	0.0	62.4	0.0	62.4	0.0	58.9	0	0.0
1998	6481.9	818	88.8	63.6	88.8	63.6	90.5	60.3	7777	88.8
1999	6373.1	818	87.6	64.7	87.6	64.6	88.9	61.6	7677	87.6
2000	7197.7	843	97.5	66.1	97.5	66.1	97.2	63.1	8555	97.4
2001	6514.2	834	88.9	67.1	88.9	67.0	89.2	64.2	7784	88.9
2002	7300.3	834	99.2	68.3	99.2	68.3	99.9	65.6	8692	99.2
2003	6579.4	834	90.3	69.2	90.3	69.1	90.1	66.5	7911	90.3
2004	7303.3	838	99.2	70.3	99.7	70.2	99.2	67.8	8584	97.7
2005	6350.9	838	87.6	70.9	87.6	70.8	86.5	68.4	7672	87.6
2006	6953.7	838	93.8	71.7	93.8	71.6	94.7	69.3	8220	93.8
2007	6672.9	838	90.2	72.3	90.2	72.2	90.9	70.0	7896	90.1
2008	7000.1	838	93.5	73.0	93.5	72.9	95.1	70.8	8208	93.4
2009	5387.7	860	72.6	73.0	72.6	72.9	71.5	70.9	6294	71.8
2010	0.0	860	0.0	70.7	0.0	70.6	0.0	68.7	0	0.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				0	577	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	8760			897		
D. Inspection, maintenance or repair without refuelling				317		
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements				19	318	
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				4	77	1
L. Human factor related					1	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
Subtotal	8760	0	0	1238	980	6
Total		8760			2224	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1977 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		65
14. Safety Systems		23
15. Reactor Cooling Systems		198
16. Steam generation systems		5
21. Fuel Handling and Storage Facilities		140
31. Turbine and auxiliaries		65
32. Feedwater and Main Steam System		48
33. Circulating Water System		5
42. Electrical Power Supply Systems		15
XX. Miscellaneous Systems		1
Total	0	565

US-346 DAVIS BESSE-1

Operator: FENOC (FIRST ENERGY NUCLEAR OPERATING CO.)
Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 894.0 MW(e)
Design Net Capacity: 906.0 MW(e)
Design Discharge Burnup: 50000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5188.2 GW(e).h
Energy Availability Factor: 67.4%
Load Factor: 66.2%
Operating Factor: 66.8%
Energy Unavailability Factor: 32.6%
Total Off-line Time: 2909 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	681.5	561.1	0.0	0.0	0.0	17.2	669.1	672.4	654.0	679.7	569.4	683.7	5188.2
EAF (%)	100.0	96.5	1.5	1.7	1.7	7.6	100.0	100.0	100.0	100.0	100.0	100.0	67.4
UCF (%)	100.0	96.5	1.6	1.7	1.7	7.6	100.0	100.0	100.0	100.0	100.0	100.0	67.4
LF (%)	102.5	93.4	0.0	0.0	0.0	2.7	100.6	101.1	101.6	102.2	88.3	102.8	66.2
OF (%)	100.0	96.4	0.0	0.0	0.0	5.8	100.0	100.0	100.0	100.0	100.0	100.0	66.8
EUf (%)	0.0	3.5	98.5	98.3	98.3	92.4	0.0	0.0	0.0	0.0	0.0	0.0	32.6
PUf (%)	0.0	3.5	98.5	98.3	98.3	92.4	0.0	0.0	0.0	0.0	0.0	0.0	32.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Jan 1970 **Lifetime Generation:** 167840.0 GW(e).h
Date of First Criticality: 08 Dec 1977 **Cumulative Energy Availability Factor:** 68.7%
Date of Grid Connection: 28/08/1977 **Cumulative Load Factor:** 66.3%
Date of Commercial Operation: 31/07/1978 **Cumulative Unit Capability Factor:** 68.8%
Cumulative Energy Unavailability Factor: 31.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	1306.7	906	32.6	32.6	32.6	32.6	32.7	32.7	2090	47.3
1979	3129.1	906	39.4	37.2	39.4	37.2	39.4	37.2	4139	47.2
1980	2093.6	892	35.0	36.3	35.0	36.3	26.7	33.0	3171	36.1
1981	4363.4	888	67.4	45.1	67.4	45.1	56.1	39.5	5902	67.4
1982	3218.1	874	51.5	46.5	51.5	46.5	42.0	40.1	4508	51.5
1983	4883.3	874	72.3	51.1	72.3	51.1	63.8	44.3	6389	72.9
1984	4291.6	874	62.5	52.8	62.5	52.8	55.9	46.1	5486	62.5
1985	1942.9	862	30.9	50.0	30.9	50.0	25.7	43.4	2729	31.2
1986	3.5	860	1.3	44.4	1.3	44.4	0.0	38.4	116	1.3
1987	5064.0	860	82.8	48.3	82.8	48.3	67.2	41.4	7308	83.4
1988	1164.4	860	20.3	45.7	20.3	45.7	15.4	39.0	1891	21.5
1989	7322.1	870	97.1	50.2	97.1	50.2	96.0	43.9	8506	97.1
1990	4161.5	874	55.6	50.6	55.6	50.6	54.4	44.7	4867	55.6
1991	5843.9	874	78.6	52.7	78.6	52.7	76.3	47.1	6962	79.5
1992	7650.5	877	99.5	55.9	99.5	55.9	99.3	50.7	8742	99.5
1993	6083.4	871	82.7	57.6	82.7	57.6	79.7	52.5	7246	82.7
1994	6385.0	868	86.9	59.4	86.9	59.4	84.0	54.4	7667	87.5
1995	7670.6	869	100.0	61.7	100.0	61.7	100.8	57.1	8760	100.0
1996	6456.3	872	84.8	62.9	84.8	62.9	84.3	58.5	7452	84.8
1997	7183.4	873	93.4	64.5	93.4	64.5	93.9	60.3	8184	93.4
1998	6130.7	873	85.4	65.5	82.0	65.3	80.2	61.3	7181	82.0
1999	7370.0	873	94.9	66.9	94.9	66.7	96.4	62.9	8311	94.9
2000	6770.5	876	87.0	67.8	87.0	67.6	87.9	64.0	7633	86.9
2001	7690.8	882	99.8	69.1	99.8	69.0	99.5	65.6	8738	99.7
2002	929.0	882	12.4	66.8	12.4	66.7	12.0	63.4	1081	12.3
2003	0.0	882	0.0	64.2	0.0	64.0	0.0	60.9	0	0.0
2004	5778.4	882	75.6	64.6	75.6	64.5	74.6	61.4	6628	75.5
2005	7177.4	873	92.8	65.6	92.8	65.5	93.9	62.6	8125	92.8
2006	6375.4	891	83.0	66.2	83.0	66.1	81.7	63.2	7265	82.9
2007	7705.8	879	99.4	67.4	99.4	67.3	100.1	64.5	8712	99.5
2008	6829.4	894	86.6	68.0	86.6	67.9	88.0	65.3	7621	86.8
2009	7609.6	879	95.4	68.9	95.4	68.8	98.8	66.3	8361	95.4
2010	5188.2	894	67.4	68.8	67.4	68.7	66.2	66.3	5851	66.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					773	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	2907			1449		
D. Inspection, maintenance or repair without refuelling				223		
E. Testing of plant systems or components	1			11	0	
H. Nuclear regulatory requirements					0	50
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					16	8
Subtotal	2908	0	0	1683	802	58
Total		2908			2543	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		64
13. Reactor Auxiliary Systems		5
15. Reactor Cooling Systems		48
16. Steam generation systems		0
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		449
35. All other I&C Systems		3
41. Main Generator Systems		1
42. Electrical Power Supply Systems		78
XX. Miscellaneous Systems		1
Total	0	668

US-275 DIABLO CANYON-1

Operator: PG&E (Pacific Gas and Electric Company)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1122.0 MW(e)
Design Net Capacity: 1084.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8677.4 GW(e).h
Energy Availability Factor: 88.5%
Load Factor: 88.3%
Operating Factor: 88.5%
Energy Unavailability Factor: 11.5%
Total Off-line Time: 1007 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	783.5	704.5	850.9	822.9	852.2	824.9	849.6	850.1	820.0	42.3	428.1	848.3	8677.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	60.5	100.0	88.5
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	60.5	100.0	88.5
LF (%)	93.9	93.4	102.1	101.9	102.1	102.1	101.8	101.8	101.5	5.1	52.9	101.6	88.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	5.5	57.8	100.0	88.5
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	39.5	0.0	11.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	39.5	0.0	11.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 23/04/1968
Date of First Criticality: 29/04/1984
Date of Grid Connection: 11 Nov 1984
Date of Commercial Operation: 05 Jul 1985

Lifetime Generation: 208273.2 GW(e).h
Cumulative Energy Availability Factor: 86.3%
Cumulative Load Factor: 85.2%
Cumulative Unit Capability Factor: 86.4%
Cumulative Energy Unavailability Factor: 13.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	5234.2	1073	90.8	90.8	90.8	90.8	85.1	85.1	5206	90.8
1986	5316.2	1073	65.7	75.7	65.7	75.7	56.6	67.8	5757	65.7
1987	8284.2	1073	95.3	83.0	95.3	83.0	88.1	75.5	8340	95.2
1988	5276.1	1073	34.6	69.8	34.6	69.8	56.0	70.1	5555	63.2
1989	7199.9	1073	80.7	72.1	80.7	72.1	76.6	71.5	7069	80.7
1990	8713.5	1073	96.2	76.4	96.2	76.4	92.7	75.3	8425	96.2
1991	7366.3	1073	80.4	77.0	80.4	77.0	78.4	75.7	7125	81.3
1992	7454.7	1073	82.3	77.7	82.3	77.7	79.1	76.2	7224	82.2
1993	9028.0	1073	98.5	80.1	98.5	80.1	96.0	78.5	8630	98.5
1994	7372.0	1073	79.9	80.1	79.9	80.1	78.4	78.5	6991	79.8
1995	7451.8	1073	81.9	80.2	81.9	80.2	79.3	78.5	7175	81.9
1996	8786.8	1073	94.7	81.5	94.7	81.5	93.2	79.8	8316	94.7
1997	8195.0	1073	87.9	82.0	87.9	82.0	87.2	80.4	7700	87.9
1998	8967.8	1073	97.8	83.1	97.8	83.1	95.4	81.5	8564	97.8
1999	8224.8	1073	90.3	83.6	88.7	83.5	87.5	81.9	7764	88.6
2000	7853.5	1073	85.2	83.7	85.2	83.6	83.3	82.0	7485	85.2
2001	9504.6	1087	99.4	84.7	99.4	84.6	100.0	83.1	8708	99.4
2002	7048.2	1087	76.0	84.2	76.0	84.1	74.0	82.6	6652	75.9
2003	9585.4	1087	100.0	85.0	100.0	85.0	100.7	83.5	8760	100.0
2004	7233.9	1087	78.2	84.7	78.2	84.6	75.8	83.1	6869	78.2
2005	8323.4	1087	88.8	84.9	88.8	84.8	87.4	83.4	7775	88.8
2006	9945.0	1122	100.0	85.6	100.0	85.5	101.2	84.2	8760	100.0
2007	8868.3	1122	89.9	85.8	89.9	85.7	90.2	84.5	7870	89.8
2008	9884.2	1122	100.0	86.4	100.0	86.4	100.3	85.2	8784	100.0
2009	8237.6	1122	83.3	86.3	83.3	86.2	83.8	85.1	7295	83.3
2010	8677.4	1122	88.5	86.4	88.5	86.3	88.3	85.2	7753	88.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					203	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	1005			814		
D. Inspection, maintenance or repair without refuelling				75		
E. Testing of plant systems or components				0		
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					9	5
Subtotal	1005	0	0	889	224	5
Total		1005			1118	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		3
14. Safety Systems		5
15. Reactor Cooling Systems		7
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		6
32. Feedwater and Main Steam System		100
33. Circulating Water System		9
35. All other I&C Systems		1
41. Main Generator Systems		2
42. Electrical Power Supply Systems		41
Total	0	175

US-323 DIABLO CANYON-2

Operator: PG&E (Pacific Gas and Electric Company)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1118.0 MW(e)
Design Net Capacity: 1106.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9752.5 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 99.6%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	776.1	762.8	845.3	819.9	847.5	821.1	846.5	846.1	816.0	805.1	752.8	813.2	9752.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	93.3	101.5	101.8	101.9	101.9	102.0	101.8	101.7	101.4	96.8	93.4	97.8	99.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 12 Sep 1970
Date of First Criticality: 19/08/1985
Date of Grid Connection: 20/10/1985
Date of Commercial Operation: 13/03/1986

Lifetime Generation: 206007.5 GW(e).h
Cumulative Energy Availability Factor: 88.7%
Cumulative Load Factor: 86.5%
Cumulative Unit Capability Factor: 88.8%
Cumulative Energy Unavailability Factor: 11.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	6548.2	1080	95.4	95.4	95.4	95.4	86.2	86.2	6729	95.4
1987	5728.8	1079	65.4	78.8	65.4	78.8	60.6	72.0	5752	65.7
1988	6243.3	1087	69.3	75.4	69.3	75.4	65.4	69.6	6086	69.3
1989	8616.0	1087	92.2	79.8	92.2	79.8	90.5	75.1	8072	92.1
1990	7578.1	1087	83.2	80.5	83.2	80.5	79.6	76.1	7284	83.2
1991	7718.5	1087	84.7	81.2	84.7	81.2	81.1	76.9	7420	84.7
1992	9247.7	1087	98.5	83.8	98.5	83.8	96.9	79.9	8651	98.5
1993	7796.2	1087	83.6	83.8	83.6	83.8	81.9	80.1	7324	83.6
1994	7896.1	1087	85.0	83.9	85.0	83.9	82.9	80.4	7439	84.9
1995	8821.0	1087	96.3	85.2	96.3	85.2	92.6	81.7	8430	96.2
1996	7932.9	1087	85.0	85.1	85.0	85.1	83.1	81.8	7459	84.9
1997	8883.5	1087	96.4	86.1	96.4	86.1	93.3	82.8	8441	96.4
1998	8159.0	1087	87.1	86.2	87.1	86.2	85.7	83.0	7624	87.0
1999	8443.7	1087	91.3	86.5	90.2	86.5	88.7	83.4	7902	90.2
2000	9188.5	1087	96.9	87.2	96.9	87.2	96.2	84.3	8512	96.9
2001	8658.4	1087	91.9	87.5	91.9	87.5	90.9	84.7	8051	91.9
2002	9286.1	1087	99.6	88.3	98.9	88.2	97.5	85.5	8663	98.9
2003	7725.2	1087	82.5	87.9	82.5	87.8	81.1	85.2	7225	82.5
2004	8017.9	1087	85.8	87.8	85.8	87.7	84.0	85.2	7535	85.8
2005	9441.7	1087	100.0	88.4	100.0	88.3	99.1	85.9	8760	100.0
2006	8529.6	1087	88.3	88.4	88.3	88.3	89.6	86.0	7734	88.3
2007	9720.1	1118	100.0	89.0	100.0	88.9	99.2	86.7	8760	100.0
2008	7263.1	1118	75.7	88.4	74.9	88.3	74.0	86.1	6578	74.9
2009	7998.2	1118	86.4	88.3	86.4	88.2	81.7	85.9	7565	86.4
2010	9752.5	1118	100.0	88.8	100.0	88.7	99.6	86.5	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					162	
B. Refuelling without a maintenance					12	
C. Inspection, maintenance or repair combined with refuelling				728		
D. Inspection, maintenance or repair without refuelling				15		
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements					10	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					26	5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	0	0	0	744	210	7
Total		0			961	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		7
15. Reactor Cooling Systems		5
31. Turbine and auxiliaries		21
32. Feedwater and Main Steam System		21
33. Circulating Water System		2
35. All other I&C Systems		8
41. Main Generator Systems		10
42. Electrical Power Supply Systems		76
Total	0	160

US-315 DONALD COOK-1

Operator: AEP (American Electric Power Company, Inc.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1009.0 MW(e)
 Design Net Capacity: 1030.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7806.9 GW(e).h
 Energy Availability Factor: 89.7%
 Load Factor: 88.3%
 Operating Factor: 89.7%
 Energy Unavailability Factor: 10.3%
 Total Off-line Time: 901 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	766.1	690.7	22.1	502.3	603.7	738.6	755.8	756.9	737.1	764.0	728.4	741.4	7806.9
EAF (%)	100.0	100.0	6.3	71.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.7
UCF (%)	100.0	100.0	6.3	71.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.7
LF (%)	102.0	101.9	3.0	69.1	80.4	101.7	100.7	100.8	101.5	101.8	100.1	98.8	88.3
OF (%)	100.0	100.0	6.5	71.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.7
EUF (%)	0.0	0.0	93.7	28.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
PUF (%)	0.0	0.0	93.7	28.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/03/1969
 Date of First Criticality: 18/01/1975
 Date of Grid Connection: 02 Oct 1975
 Date of Commercial Operation: 28/08/1975
 Lifetime Generation: 206972.6 GW(e).h
 Cumulative Energy Availability Factor: 68.2%
 Cumulative Load Factor: 65.2%
 Cumulative Unit Capability Factor: 68.4%
 Cumulative Energy Unavailability Factor: 31.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1975	2557.1	848	84.7	84.7	84.7	84.7	83.4	83.4	83.4	3141	85.5
1976	6804.9	983	79.2	80.6	79.2	80.6	78.8	80.0	80.0	7298	83.1
1977	4785.8	1044	52.4	68.2	52.4	68.2	52.3	67.9	67.9	6658	76.0
1978	6286.9	1044	68.7	68.4	68.7	68.4	68.7	68.1	68.1	6438	73.5
1979	5660.2	1044	61.9	66.9	61.9	66.9	61.9	66.7	66.7	5666	64.7
1980	6461.3	1044	79.5	69.3	74.8	68.4	70.5	67.4	67.4	6470	73.7
1981	6781.5	1044	77.1	70.5	77.1	69.8	74.2	68.5	68.5	6663	76.1
1982	5352.7	1044	64.2	69.6	64.2	69.0	58.5	67.1	67.1	5487	62.6
1983	5286.7	1030	64.3	69.0	64.3	68.4	58.6	66.1	66.1	5628	64.2
1984	7550.8	1020	91.3	71.4	91.3	70.9	84.3	68.0	68.0	8016	91.3
1985	2116.1	1020	29.9	67.4	29.9	66.9	23.7	63.8	63.8	2489	28.4
1986	6650.1	1020	85.5	69.0	85.5	68.6	74.4	64.7	64.7	7464	85.2
1987	5033.8	1020	68.2	68.9	68.2	68.5	56.3	64.0	64.0	5917	67.5
1988	7467.8	1020	95.5	70.9	95.5	70.5	83.3	65.5	65.5	8379	95.4
1989	5433.0	1020	69.9	70.8	69.9	70.5	60.8	65.2	65.2	6069	69.3
1990	6301.6	1020	79.2	71.4	79.2	71.1	70.5	65.5	65.5	6939	79.2
1991	7338.2	1013	86.0	72.3	86.0	72.0	82.7	66.5	66.5	7524	85.9
1992	4990.7	1008	65.1	71.9	65.1	71.6	56.3	66.0	66.0	5690	64.8
1993	8759.4	1006	100.0	73.4	100.0	73.1	99.3	67.7	67.7	8760	100.0
1994	5759.5	1000	71.0	73.2	71.0	73.0	65.7	67.6	67.6	6214	70.9
1995	5396.8	1000	66.4	72.9	66.4	72.7	61.6	67.4	67.4	5809	66.3
1996	8373.3	1000	97.6	74.0	97.6	73.8	95.3	68.6	68.6	8574	97.6
1997	4545.9	1000	52.4	73.1	52.4	72.9	51.9	67.9	67.9	4608	52.6
1998	0.0	1000	0.0	70.0	0.0	69.8	0.0	65.1	65.1	0	0.0
1999	0.0	1000	0.0	67.2	0.0	67.0	0.0	62.4	62.4	0	0.0
2000	129.8	1000	2.8	64.7	2.8	64.5	1.5	60.1	60.1	242	2.8
2001	7797.9	1000	90.6	65.7	89.5	65.4	89.0	61.1	61.1	7840	89.5
2002	7740.9	1000	88.9	66.5	88.9	66.3	88.4	62.1	62.1	7782	88.8
2003	6570.1	1000	74.1	66.8	74.1	66.6	75.0	62.6	62.6	6489	74.1
2004	8831.5	1000	97.7	67.8	97.7	67.6	100.5	63.8	63.8	8588	97.8
2005	8055.8	1016	90.7	68.6	90.7	68.4	90.5	64.7	64.7	7940	90.6
2006	7296.2	1016	82.9	69.0	82.9	68.8	82.0	65.3	65.3	7256	82.8
2007	9252.7	1009	99.6	70.0	99.6	69.8	104.7	66.5	66.5	8728	99.6
2008	5639.7	1009	61.6	69.7	61.6	69.5	63.6	66.4	66.4	5407	61.6
2009	263.4	1009	3.3	67.8	3.3	67.6	3.0	64.6	64.6	289	3.3
2010	7806.9	1009	89.7	68.4	89.7	68.2	88.3	65.2	65.2	7859	89.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					522	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	900			1111		
D. Inspection, maintenance or repair without refuelling				124		
E. Testing of plant systems or components				8	6	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				2		
H. Nuclear regulatory requirements					3	21
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					807	2
P. Fire					13	
Subtotal	900	0	0	1245	1362	23
Total		900			2630	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		18
14. Safety Systems		8
15. Reactor Cooling Systems		34
16. Steam generation systems		7
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		361
32. Feedwater and Main Steam System		18
33. Circulating Water System		36
35. All other I&C Systems		0
41. Main Generator Systems		19
42. Electrical Power Supply Systems		16
Total	0	518

US-316 DONALD COOK-2

Operator: AEP (American Electric Power Company, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1060.0 MW(e)
Design Net Capacity: 1100.0 MW(e)
Design Discharge Burnup: 48000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7839.2 GW(e).h
Energy Availability Factor: 83.4%
Load Factor: 84.4%
Operating Factor: 83.4%
Energy Unavailability Factor: 16.6%
Total Off-line Time: 1458 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	830.2	749.1	827.6	792.2	808.7	756.9	769.4	775.7	765.2	110.1	0.0	654.0	7839.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	16.1	0.1	84.8	83.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	16.1	0.1	84.8	83.4
LF (%)	105.3	105.2	105.1	103.8	102.5	99.2	97.6	98.4	100.3	14.0	0.0	82.9	84.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	16.1	0.0	84.8	83.4
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.9	99.9	15.2	16.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	83.9	99.9	15.2	16.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/03/1969
Date of First Criticality: 03 Oct 1978
Date of Grid Connection: 22/03/1978
Date of Commercial Operation: 07 Jan 1978

Lifetime Generation: 200978.4 GW(e).h
Cumulative Energy Availability Factor: 69.2%
Cumulative Load Factor: 66.0%
Cumulative Unit Capability Factor: 69.4%
Cumulative Energy Unavailability Factor: 30.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	3122.8	1078	65.4	65.4	65.4	65.4	65.3	65.3	3411	77.2
1979	5953.5	1082	62.8	63.7	62.8	63.7	62.8	63.7	5773	65.9
1980	6691.2	1082	80.1	70.3	74.8	68.1	70.4	66.4	6535	74.4
1981	6384.8	1082	71.2	70.5	71.2	69.0	67.4	66.6	6178	70.5
1982	6995.6	1082	77.2	72.0	77.2	70.8	73.8	68.2	6738	76.9
1983	7013.6	1071	78.3	73.1	78.3	72.2	74.8	69.4	6835	78.0
1984	5364.4	1060	59.2	71.0	59.2	70.2	57.6	67.6	5196	59.2
1985	5683.6	1060	66.9	70.5	66.9	69.8	61.2	66.8	5852	66.8
1986	4335.6	1060	61.5	69.4	61.5	68.8	46.7	64.4	5389	61.5
1987	5026.6	1060	71.4	69.6	71.4	69.1	54.1	63.4	6248	71.3
1988	2323.3	1060	30.9	66.0	30.9	65.5	25.0	59.7	2715	30.9
1989	6661.0	1060	74.4	66.7	74.4	66.2	71.7	60.8	6518	74.4
1990	4813.3	1060	55.4	65.8	55.4	65.4	51.8	60.1	4854	55.4
1991	8185.9	1065	92.2	67.8	91.5	67.3	87.7	62.1	8013	91.5
1992	1427.3	1072	20.5	64.5	20.5	64.1	15.2	58.9	1714	19.5
1993	7553.8	1070	96.6	66.6	96.6	66.2	80.6	60.3	8459	96.6
1994	3531.5	1060	54.4	65.8	54.4	65.5	38.0	58.9	4757	54.3
1995	8602.5	1060	94.5	67.4	94.5	67.1	92.6	60.8	8268	94.4
1996	8022.6	1060	87.0	68.5	87.0	68.2	86.2	62.2	7641	87.0
1997	5875.2	1060	64.9	68.3	64.9	68.0	63.3	62.2	5705	65.1
1998	0.0	1060	0.0	65.0	0.0	64.7	0.0	59.2	0	0.0
1999	0.0	1060	0.0	62.0	0.0	61.7	0.0	56.5	0	0.0
2000	4789.8	1060	51.9	61.6	51.9	61.3	51.4	56.3	4557	51.9
2001	7963.4	1060	87.8	62.7	87.8	62.4	85.8	57.5	7690	87.8
2002	7687.7	1060	83.8	63.5	83.8	63.3	82.8	58.5	7335	83.7
2003	7112.2	1060	75.5	64.0	75.5	63.7	76.6	59.2	6610	75.5
2004	7938.5	1060	84.3	64.8	84.3	64.5	85.3	60.2	7407	84.3
2005	9415.5	1077	98.2	66.0	98.2	65.8	99.8	61.7	8603	98.2
2006	8388.8	1077	88.3	66.8	88.3	66.6	88.9	62.6	7732	88.3
2007	8124.5	1060	85.3	67.4	85.3	67.2	87.5	63.5	7492	85.5
2008	9396.6	1060	98.5	68.4	98.5	68.2	100.9	64.7	8650	98.5
2009	8063.0	1060	84.9	68.9	84.9	68.7	86.8	65.4	7434	84.9
2010	7839.2	1060	83.4	69.4	83.4	69.2	84.4	66.0	7302	83.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					511	
B. Refuelling without a maintenance					14	
C. Inspection, maintenance or repair combined with refuelling	1457			1075		
D. Inspection, maintenance or repair without refuelling				116	119	
E. Testing of plant systems or components				0		
H. Nuclear regulatory requirements					2	20
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					679	
Z. Others					14	
Subtotal	1457	0	0	1191	1339	21
Total		1457			2551	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		13
13. Reactor Auxiliary Systems		47
15. Reactor Cooling Systems		90
16. Steam generation systems		163
17. Safety I&C Systems (excluding reactor I&C)		8
31. Turbine and auxiliaries		24
32. Feedwater and Main Steam System		20
33. Circulating Water System		34
35. All other I&C Systems		13
41. Main Generator Systems		42
42. Electrical Power Supply Systems		42
Total	0	496

US-237 DRESDEN-2

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 867.0 MW(e)
Design Net Capacity: 794.0 MW(e)
Design Discharge Burnup: 47000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7726.9 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 101.7%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	662.8	596.3	661.2	634.8	650.9	632.0	649.5	648.6	631.9	654.8	645.4	658.8	7726.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	102.8	102.4	102.6	101.7	100.9	101.2	100.7	100.5	101.2	101.5	103.2	102.1	101.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 01 Oct 1966
Date of First Criticality: 01 Jul 1970
Date of Grid Connection: 13/04/1970
Date of Commercial Operation: 06 Sep 1970

Lifetime Generation: 194467.7 GW(e).h
Cumulative Energy Availability Factor: 78.3%
Cumulative Load Factor: 68.5%
Cumulative Unit Capability Factor: 78.3%
Cumulative Energy Unavailability Factor: 21.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1970	1002.0	804	100.0	100.0	100.0	100.0	23.9	23.9	1945	37.9
1971	2806.3	815	100.0	100.0	100.0	100.0	39.3	33.6	5694	65.0
1972	3370.5	815	100.0	100.0	100.0	100.0	47.1	38.8	5240	59.7
1973	5014.5	800	90.8	97.5	90.8	97.5	71.6	47.8	7672	87.6
1974	3376.0	800	58.3	89.0	58.3	89.0	48.2	47.9	5113	58.4
1975	2957.0	800	42.2	80.7	42.2	80.7	42.2	46.9	4826	55.1
1976	4374.4	781	64.1	78.3	64.1	78.3	63.8	49.4	6660	75.8
1977	3538.1	772	52.4	75.0	52.4	75.0	52.3	49.8	6297	71.9
1978	5704.5	772	84.4	76.0	84.4	76.0	84.4	53.7	8244	94.1
1979	4942.9	772	73.1	75.7	73.1	75.7	73.1	55.6	7141	81.5
1980	4580.4	772	93.5	77.4	93.5	77.4	67.5	56.7	8193	93.3
1981	3416.0	772	60.7	76.0	60.1	75.9	50.5	56.2	5260	60.0
1982	5123.1	772	93.0	77.3	92.4	77.2	75.8	57.7	8094	92.4
1983	3402.2	772	59.2	76.0	58.9	75.9	50.3	57.2	5076	57.9
1984	4468.4	772	72.9	75.8	72.9	75.7	65.9	57.8	6402	72.9
1985	3106.0	772	54.5	74.4	54.5	74.3	45.9	57.0	4678	53.4
1986	4655.7	772	77.2	74.6	77.2	74.5	68.8	57.7	6761	77.2
1987	3362.6	772	61.0	73.8	61.0	73.8	49.7	57.3	5342	61.0
1988	4325.2	772	78.9	74.1	78.9	74.0	63.8	57.6	6931	78.9
1989	4751.7	772	80.2	74.4	80.2	74.3	70.3	58.3	7023	80.2
1990	4116.9	772	67.6	74.1	67.6	74.0	60.9	58.4	5920	67.6
1991	2984.2	772	58.0	73.4	58.0	73.3	44.1	57.7	5031	57.4
1992	4185.8	772	84.5	73.8	84.5	73.8	61.7	57.9	7419	84.5
1993	3058.6	772	54.7	73.0	54.7	73.0	45.2	57.4	4790	54.7
1994	4086.1	772	66.3	72.8	66.3	72.7	60.4	57.5	5808	66.3
1995	1890.5	772	33.5	71.3	33.5	71.2	28.0	56.4	2938	33.5
1996	2161.4	772	42.5	70.2	42.5	70.1	31.9	55.4	3731	42.5
1997	5578.4	772	89.4	70.9	89.4	70.8	82.5	56.4	7738	88.3
1998	5632.9	772	85.6	71.4	85.6	71.3	83.3	57.4	7496	85.6
1999	6229.5	772	92.7	72.1	92.7	72.0	92.1	58.5	8122	92.7
2000	6867.4	772	99.6	73.0	99.6	72.9	101.3	59.9	8747	99.6
2001	6072.7	772	91.2	73.6	91.2	73.5	89.8	60.8	8005	91.4
2002	7527.5	850	100.0	74.4	100.0	74.4	101.1	62.2	8760	100.0
2003	6703.1	850	92.0	75.0	92.0	75.0	90.0	63.1	7999	91.3
2004	5909.3	850	80.2	75.2	80.2	75.1	79.1	63.6	7045	80.2
2005	6590.1	850	88.0	75.6	88.0	75.5	88.5	64.3	7710	88.0
2006	7273.2	867	96.9	76.2	96.9	76.2	95.8	65.3	8485	96.9
2007	6972.7	867	92.8	76.7	92.8	76.6	91.8	66.1	8132	92.8
2008	7469.5	867	98.4	77.3	98.4	77.3	98.1	67.0	8639	98.3
2009	6902.6	867	91.7	77.7	91.7	77.7	90.9	67.6	8033	91.7
2010	7726.9	867	100.0	78.3	100.0	78.3	101.7	68.5	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					565	
B. Refuelling without a maintenance					18	
C. Inspection, maintenance or repair combined with refuelling				1222		
D. Inspection, maintenance or repair without refuelling				65	2	
E. Testing of plant systems or components				9	7	
H. Nuclear regulatory requirements					4	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					64	3
Subtotal	0	0	0	1296	660	3
Total		0			1959	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		9
12. Reactor I&C Systems		72
13. Reactor Auxiliary Systems		10
14. Safety Systems		19
15. Reactor Cooling Systems		99
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		136
32. Feedwater and Main Steam System		23
35. All other I&C Systems		19
41. Main Generator Systems		50
42. Electrical Power Supply Systems		26
XX. Miscellaneous Systems		11
Total	0	475

US-249 DRESDEN-3

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUF at the beginning of 2010): 867.0 MW(e)
Design Net Capacity: 794.0 MW(e)
Design Discharge Burnup: 47000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6866.2 GW(e).h
Energy Availability Factor: 92.2%
Load Factor: 90.4%
Operating Factor: 92.2%
Energy Unavailability Factor: 7.8%
Total Off-line Time: 684 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	644.7	583.7	640.3	620.1	631.6	616.7	634.1	633.6	616.4	531.0	67.1	646.9	6866.2
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.1	17.6	100.0	92.2
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.1	17.6	100.0	92.2
LF (%)	99.9	100.2	99.4	99.3	97.9	98.8	98.3	98.2	98.7	82.3	10.7	100.3	90.4
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.0	14.4	100.0	92.2
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	82.4	0.0	7.8
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	82.4	0.0	7.1
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 14/10/1966
Date of First Criticality: 01 Dec 1971
Date of Grid Connection: 22/07/1971
Date of Commercial Operation: 16/11/1971

Lifetime Generation: 187219.3 GW(e).h
Cumulative Energy Availability Factor: 74.7%
Cumulative Load Factor: 68.4%
Cumulative Unit Capability Factor: 74.8%
Cumulative Energy Unavailability Factor: 25.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	590.0	794	100.0	100.0	100.0	100.0	49.4	49.4	814	55.6
1972	5175.6	815	100.0	100.0	100.0	100.0	72.3	69.0	7549	85.9
1973	3703.6	800	69.2	85.9	69.2	85.9	52.8	61.6	5905	67.4
1974	3608.9	800	65.8	79.6	65.8	79.6	51.5	58.5	5778	66.0
1975	2211.2	800	31.5	68.2	31.5	68.2	31.6	52.0	4505	51.4
1976	4037.2	781	58.7	66.4	58.7	66.4	58.8	53.3	7231	82.3
1977	5186.4	773	76.6	68.0	76.6	68.0	76.6	57.0	8072	92.1
1978	3835.3	773	56.6	66.4	56.6	66.4	56.6	56.9	6280	71.7
1979	3482.9	773	51.4	64.6	51.4	64.6	51.4	56.3	5930	67.7
1980	4335.5	773	72.3	65.5	72.3	65.5	63.9	57.1	6307	71.8
1981	5177.7	773	95.1	68.3	94.5	68.3	76.5	59.0	8256	94.2
1982	3896.4	773	64.3	68.0	63.8	67.9	57.5	58.8	5562	63.5
1983	4159.7	773	73.1	68.4	73.1	68.3	61.4	59.1	6401	73.1
1984	2135.5	773	37.7	66.1	37.7	66.0	31.5	57.0	3309	37.7
1985	4401.3	773	75.6	66.8	75.6	66.7	65.0	57.5	6618	75.5
1986	1498.3	773	28.1	64.2	28.1	64.2	22.1	55.2	2456	28.0
1987	4395.5	773	75.3	64.9	75.3	64.8	64.9	55.8	6591	75.2
1988	4168.4	773	71.5	65.3	71.5	65.2	61.4	56.1	6278	71.5
1989	5119.5	773	82.6	66.2	82.6	66.2	75.6	57.2	7235	82.6
1990	5149.8	773	83.0	67.1	83.0	67.0	76.1	58.2	7272	83.0
1991	2584.2	773	59.9	66.7	59.9	66.7	38.2	57.2	5247	59.9
1992	3077.1	773	61.1	66.5	61.1	66.4	45.3	56.6	5364	61.1
1993	4969.0	773	80.4	67.1	80.4	67.1	73.4	57.4	7040	80.4
1994	1666.4	773	34.3	65.7	34.3	65.7	24.6	56.0	3009	34.3
1995	3477.3	773	59.5	65.4	59.5	65.4	51.4	55.8	5209	59.5
1996	2962.1	773	48.9	64.8	48.9	64.7	43.6	55.3	4273	48.6
1997	4046.2	773	68.6	64.9	68.6	64.9	59.8	55.5	5900	67.4
1998	6234.6	773	93.1	66.0	93.1	65.9	92.1	56.8	8157	93.1
1999	6130.0	773	91.1	66.8	91.1	66.8	90.5	58.0	7978	91.1
2000	6365.1	773	93.8	67.8	93.8	67.7	93.7	59.2	8243	93.8
2001	6466.0	773	95.4	68.7	95.4	68.6	95.5	60.4	8359	95.4
2002	6060.9	850	90.5	69.4	90.5	69.4	87.3	61.3	7915	90.4
2003	6963.9	850	94.2	70.2	94.2	70.2	93.5	62.4	8206	93.7
2004	6436.9	850	85.9	70.7	85.9	70.7	86.2	63.2	7544	85.9
2005	7032.4	850	93.3	71.5	93.3	71.4	94.4	64.2	8169	93.2
2006	7171.9	867	94.7	72.2	94.7	72.2	94.4	65.1	8298	94.7
2007	7558.1	867	99.5	73.0	99.5	73.0	99.5	66.2	8715	99.5
2008	6919.1	867	92.4	73.6	92.4	73.6	90.9	66.9	8118	92.4
2009	7364.8	867	97.7	74.3	97.7	74.2	97.0	67.7	8557	97.7
2010	6866.2	867	92.2	74.8	92.2	74.7	90.4	68.4	8076	92.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		64			625	
B. Refuelling without a maintenance					22	
C. Inspection, maintenance or repair combined with refuelling	618			1267		
D. Inspection, maintenance or repair without refuelling				94		
E. Testing of plant systems or components				1	5	
H. Nuclear regulatory requirements				8	1	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				8	9	1
Z. Others					1	
Subtotal	618	64	0	1378	663	2
Total		682			2043	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems	64	16
13. Reactor Auxiliary Systems		2
14. Safety Systems		52
15. Reactor Cooling Systems		51
17. Safety I&C Systems (excluding reactor I&C)		61
31. Turbine and auxiliaries		179
32. Feedwater and Main Steam System		59
33. Circulating Water System		6
35. All other I&C Systems		1
41. Main Generator Systems		15
42. Electrical Power Supply Systems		86
XX. Miscellaneous Systems		65
Total	64	600

US-331 DUANE ARNOLD-1

Operator: NEXTERA (NextEra Energy Resources, LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 601.0 MW(e)
 Design Net Capacity: 538.0 MW(e)
 Design Discharge Burnup: 27800 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4454.4 GW(e).h
 Energy Availability Factor: 85.8%
 Load Factor: 84.6%
 Operating Factor: 85.3%
 Energy Unavailability Factor: 14.2%
 Total Off-line Time: 1289 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	448.4	416.4	451.8	365.4	410.8	428.4	444.9	442.4	418.0	323.3	0.0	304.5	4454.4
EAF (%)	100.0	100.0	100.0	83.9	93.9	100.0	100.0	100.0	100.0	72.0	3.8	76.2	85.8
UCF (%)	100.0	100.0	100.0	83.9	93.9	100.0	100.0	100.0	100.0	72.0	3.8	76.2	85.8
LF (%)	100.3	103.1	101.2	84.4	91.9	99.0	99.5	98.9	96.6	72.3	0.0	68.1	84.6
OF (%)	100.0	100.0	100.0	83.8	93.1	100.0	100.0	100.0	100.0	74.1	0.0	72.2	85.3
EUF (%)	0.0	0.0	0.0	16.1	6.1	0.0	0.0	0.0	0.0	28.0	96.2	23.8	14.2
PUF (%)	0.0	0.0	0.0	16.1	6.1	0.0	0.0	0.0	0.0	28.0	96.2	23.8	14.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 22/06/1970
 Date of First Criticality: 23/03/1974
 Date of Grid Connection: 19/05/1974
 Date of Commercial Operation: 02 Jan 1975

Lifetime Generation: 127617.7 GW(e).h
 Cumulative Energy Availability Factor: 79.0%
 Cumulative Load Factor: 75.1%
 Cumulative Unit Capability Factor: 79.1%
 Cumulative Energy Unavailability Factor: 21.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	2099.6	515	79.4	79.4	79.4	79.4	50.9	50.9	6298	78.6
1976	2489.4	515	55.1	66.7	55.1	66.7	55.0	53.0	6847	77.9
1977	2897.8	515	64.3	65.9	64.3	65.9	64.2	56.9	6908	78.9
1978	1227.5	515	27.2	56.0	27.2	56.0	27.2	49.3	2902	33.1
1979	2898.9	515	64.3	57.7	64.3	57.7	64.3	52.3	6830	78.0
1980	2796.3	515	74.8	60.6	73.2	60.3	61.8	53.9	6456	73.5
1981	2219.5	515	69.3	61.8	69.3	61.6	49.2	53.3	6108	69.7
1982	2280.4	515	74.2	63.4	74.2	63.2	50.5	52.9	6543	74.7
1983	2324.3	515	61.8	63.2	61.8	63.0	51.5	52.8	5503	62.8
1984	2717.6	515	72.2	64.1	72.2	64.0	60.1	53.5	6402	72.9
1985	1940.5	515	52.6	63.1	52.6	62.9	43.0	52.5	4711	53.8
1986	3192.8	515	81.5	64.6	81.5	64.5	70.8	54.1	7495	85.6
1987	2546.6	515	62.0	64.4	62.0	64.3	56.4	54.3	5513	62.9
1988	3520.2	520	72.3	65.0	72.3	64.9	77.0	55.9	7128	81.1
1989	3143.6	536	62.5	64.8	62.5	64.7	66.9	56.7	6561	74.9
1990	3021.0	538	74.7	65.5	74.7	65.4	64.1	57.2	6498	74.2
1991	4146.8	532	93.9	67.2	93.9	67.1	88.9	59.1	8217	93.8
1992	3434.6	515	80.5	67.9	80.5	67.8	75.9	60.0	7112	81.0
1993	3241.4	515	76.6	68.4	76.5	68.3	71.8	60.6	6755	77.1
1994	4108.4	515	92.0	69.6	92.0	69.5	91.1	62.2	8078	92.2
1995	3737.0	515	82.4	70.2	82.4	70.1	82.8	63.1	7253	82.8
1996	3938.5	520	89.9	71.1	89.9	71.0	86.2	64.2	7906	90.0
1997	4155.5	520	92.7	72.0	92.7	71.9	91.2	65.4	8125	92.8
1998	3839.2	520	85.2	72.6	85.2	72.5	84.3	66.2	7477	85.4
1999	3649.0	520	83.0	73.0	83.0	72.9	80.1	66.7	7267	83.0
2000	4455.7	520	97.4	73.9	97.4	73.9	97.5	67.9	8553	97.4
2001	3860.6	565	85.4	74.4	85.4	74.3	84.1	68.5	7473	85.3
2002	4581.1	565	95.1	75.2	93.6	75.0	92.7	69.5	8147	93.0
2003	3998.6	565	83.8	75.5	83.8	75.4	80.8	69.9	7209	82.3
2004	4929.9	565	97.9	76.3	97.9	76.2	99.3	71.0	8596	97.9
2005	4544.5	562	90.0	76.8	90.0	76.7	92.3	71.7	7882	90.0
2006	5095.4	581	98.9	77.5	98.9	77.4	100.1	72.7	8664	98.9
2007	4518.9	580	86.7	77.8	86.7	77.7	88.9	73.2	7598	86.7
2008	5282.8	580	100.0	78.6	100.0	78.5	103.7	74.2	8784	100.0
2009	4678.9	579	90.1	78.9	90.1	78.8	92.2	74.8	7891	90.1
2010	4454.4	601	85.8	79.1	85.8	79.0	84.6	75.1	7471	85.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					400	
B. Refuelling without a maintenance					41	
C. Inspection, maintenance or repair combined with refuelling	1119			836		
D. Inspection, maintenance or repair without refuelling	167			225	0	
E. Testing of plant systems or components	0			19	2	
H. Nuclear regulatory requirements				44	17	9
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				8	39	4
L. Human factor related					1	
Subtotal	1286	0	0	1132	500	13
Total		1286			1645	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		11
14. Safety Systems		16
15. Reactor Cooling Systems		221
17. Safety I&C Systems (excluding reactor I&C)		6
31. Turbine and auxiliaries		44
32. Feedwater and Main Steam System		33
35. All other I&C Systems		1
41. Main Generator Systems		6
42. Electrical Power Supply Systems		20
XX. Miscellaneous Systems		2
Total	0	366

US-341 ENRICO FERMI-2

Operator: DTEDISON (DETROIT EDISON CO.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 1106.0 MW(e)
 Design Net Capacity: 1093.0 MW(e)
 Design Discharge Burnup: 19404 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7743.3 GW(e).h
 Energy Availability Factor: 87.1%
 Load Factor: 79.9%
 Operating Factor: 84.2%
 Energy Unavailability Factor: 12.9%
 Total Off-line Time: 1387 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	826.9	749.5	623.8	793.3	813.9	479.7	795.3	794.2	778.9	618.4	0.0	469.3	7743.3
EAF (%)	100.0	100.0	83.1	100.0	100.0	100.0	100.0	100.0	100.0	73.8	0.0	87.5	87.1
UCF (%)	100.0	100.0	83.1	100.0	100.0	100.0	100.0	100.0	100.0	73.8	0.0	87.5	87.1
LF (%)	100.5	100.8	75.9	99.6	98.9	60.2	96.7	96.5	97.8	75.2	0.0	57.0	79.9
OF (%)	100.0	100.0	83.3	100.0	100.0	64.3	100.0	100.0	100.0	76.3	0.0	85.3	84.2
EUF (%)	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	26.2	100.0	12.5	12.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2	100.0	12.5	11.5
UCLF (%)	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 26/09/1972
 Date of First Criticality: 21/06/1985
 Date of Grid Connection: 21/09/1986
 Date of Commercial Operation: 23/01/1988

Lifetime Generation: 162425.7 GW(e).h
 Cumulative Energy Availability Factor: 78.3%
 Cumulative Load Factor: 75.2%
 Cumulative Unit Capability Factor: 78.3%
 Cumulative Energy Unavailability Factor: 21.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	4060.1	1093	57.0	57.0	57.0	57.0	45.0	45.0	4719	57.2
1989	5230.7	1093	63.4	60.3	63.4	60.3	54.6	50.0	5575	63.6
1990	7118.3	1059	82.3	67.6	82.3	67.6	76.7	58.9	7266	82.9
1991	6180.9	1059	72.8	68.9	72.8	68.9	66.6	60.8	6466	73.8
1992	7356.8	1060	79.1	71.0	79.1	71.0	79.0	64.5	7019	79.9
1993	8284.7	1085	92.1	74.6	92.1	74.6	87.2	68.3	8076	92.2
1994	0.0	1085	0.0	63.7	0.0	63.7	0.0	58.4	0	0.0
1995	5132.0	997	71.7	64.7	71.7	64.7	58.7	58.4	6509	74.3
1996	4790.0	876	58.2	64.1	58.2	64.1	62.3	58.8	5859	66.7
1997	5579.9	1000	70.5	64.7	70.5	64.7	63.6	59.3	5461	62.3
1998	7146.8	1098	78.4	66.0	78.4	66.0	74.3	60.7	6868	78.4
1999	9484.7	1081	99.3	68.9	99.3	68.9	100.1	64.1	8698	99.3
2000	8237.8	1083	85.7	70.2	85.7	70.2	86.6	65.9	7514	85.5
2001	8564.0	1089	89.3	71.6	89.3	71.6	89.8	67.7	7837	89.5
2002	9302.9	1089	98.5	73.5	98.5	73.5	97.5	69.7	8630	98.5
2003	8127.8	1089	85.3	74.2	85.3	74.2	85.2	70.7	7479	85.4
2004	8453.1	1089	88.2	75.1	88.2	75.1	88.4	71.8	7764	88.4
2005	8767.6	1111	90.8	76.0	90.8	76.0	90.1	72.9	7955	90.8
2006	7497.3	1101	80.9	76.3	80.9	76.3	77.7	73.1	7095	81.0
2007	8318.4	1122	86.1	76.8	86.1	76.8	84.6	73.7	7542	86.1
2008	9614.3	1122	99.1	77.9	99.1	77.9	97.6	74.9	8706	99.1
2009	7424.7	1122	78.3	77.9	78.3	77.9	75.5	75.0	6855	78.3
2010	7743.3	1106	87.1	78.3	87.1	78.3	79.9	75.2	7373	84.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		123		9	965	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling	1004			652		
D. Inspection, maintenance or repair without refuelling				195	2	
H. Nuclear regulatory requirements					2	
J. Grid limitation, failure or grid unavailability			256		5	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	
Subtotal	1004	123	256	856	983	0
Total		1383			1839	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		34
12. Reactor I&C Systems		21
13. Reactor Auxiliary Systems		53
14. Safety Systems		15
15. Reactor Cooling Systems		22
17. Safety I&C Systems (excluding reactor I&C)		18
31. Turbine and auxiliaries		431
32. Feedwater and Main Steam System		5
33. Circulating Water System		2
35. All other I&C Systems		14
41. Main Generator Systems	123	195
42. Electrical Power Supply Systems		100
XX. Miscellaneous Systems		49
Total	123	959

US-348 FARLEY-1

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 851.0 MW(e)
Design Net Capacity: 829.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6577.4 GW(e).h
Energy Availability Factor: 89.1%
Load Factor: 88.2%
Operating Factor: 89.1%
Energy Unavailability Factor: 10.9%
Total Off-line Time: 954 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	641.2	573.3	630.8	619.2	635.7	610.9	614.7	626.1	595.9	153.6	206.9	669.0	6577.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.0	41.2	100.0	89.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.0	41.2	100.0	89.1
LF (%)	101.3	100.3	99.8	101.1	100.4	99.7	97.1	98.9	97.3	24.3	33.7	105.7	88.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.7	40.2	100.0	89.1
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.0	58.8	0.0	10.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.0	58.8	0.0	10.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1970
Date of First Criticality: 08 Sep 1977
Date of Grid Connection: 18/08/1977
Date of Commercial Operation: 12 Jan 1977

Lifetime Generation: 196372.1 GW(e).h
Cumulative Energy Availability Factor: 83.5%
Cumulative Load Factor: 81.8%
Cumulative Unit Capability Factor: 83.6%
Cumulative Energy Unavailability Factor: 16.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	395.9	820	100.0	100.0	100.0	100.0	64.2	64.2	512	68.8
1978	5919.8	829	81.5	83.0	81.5	83.0	81.5	80.2	7568	86.4
1979	1732.4	829	23.9	54.6	23.9	54.6	23.9	53.2	2502	28.6
1980	4607.8	814	74.4	61.0	70.2	59.6	64.4	56.8	6110	69.6
1981	2653.0	804	41.5	56.3	41.5	55.3	37.7	52.2	3624	41.4
1982	5233.3	804	79.3	60.7	79.3	59.9	74.3	56.5	6936	79.2
1983	5268.6	804	77.7	63.5	77.7	62.8	74.8	59.4	6832	78.0
1984	5432.7	804	78.5	65.6	78.5	65.0	76.9	61.9	6920	78.8
1985	5868.7	816	84.3	67.9	84.3	67.4	82.1	64.4	7378	84.2
1986	5738.6	827	82.4	69.5	82.4	69.1	79.2	66.1	7247	82.7
1987	6444.9	825	93.7	72.0	93.7	71.5	89.2	68.4	8201	93.6
1988	5908.2	813	83.8	73.0	83.8	72.6	82.7	69.7	7363	83.8
1989	6022.6	824	86.0	74.1	86.0	73.8	83.4	70.8	7520	85.8
1990	6908.6	824	99.1	76.0	99.1	75.7	95.7	72.7	8681	99.1
1991	5416.1	814	78.9	76.2	78.4	75.9	76.0	73.0	6870	78.4
1992	5667.9	812	81.0	76.6	81.0	76.2	79.5	73.4	7119	81.0
1993	6873.9	812	97.3	77.8	97.3	77.5	96.6	74.8	8522	97.3
1994	6059.8	812	86.1	78.3	86.1	78.0	85.2	75.4	7546	86.1
1995	5752.0	812	82.4	78.5	82.4	78.3	80.9	75.7	7220	82.4
1996	7142.3	812	99.5	79.6	99.5	79.4	100.1	77.0	8740	99.5
1997	5434.0	821	77.7	79.5	77.7	79.3	75.5	76.9	6803	77.7
1998	5237.9	822	74.8	79.3	74.8	79.1	72.7	76.7	6539	74.6
1999	7226.5	847	99.3	80.2	99.3	80.0	97.4	77.7	8695	99.3
2000	5204.1	828	76.8	80.1	76.8	79.9	71.6	77.4	6775	77.1
2001	6392.5	833	88.3	80.4	88.3	80.3	87.6	77.9	7736	88.3
2002	7221.8	833	98.7	81.2	98.7	81.0	99.0	78.7	8641	98.6
2003	6609.9	830	90.3	81.5	90.3	81.4	90.9	79.2	7909	90.3
2004	6423.9	851	87.0	81.7	87.0	81.6	86.8	79.5	7627	86.8
2005	7402.2	833	99.4	82.4	99.4	82.2	101.4	80.3	8709	99.4
2006	6419.3	851	86.5	82.5	86.5	82.4	86.1	80.5	7578	86.5
2007	6530.8	851	87.5	82.7	87.5	82.5	87.6	80.7	7663	87.5
2008	7281.5	851	97.7	83.2	97.7	83.1	97.4	81.3	8579	97.7
2009	6711.1	851	90.5	83.4	90.5	83.3	90.0	81.6	7922	90.4
2010	6577.4	851	89.1	83.6	89.1	83.5	88.2	81.8	7806	89.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					219	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	952			1036		
D. Inspection, maintenance or repair without refuelling				59		
E. Testing of plant systems or components				2	0	
H. Nuclear regulatory requirements					12	10
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	5
L. Human factor related					0	
Subtotal	952	0	0	1097	246	15
Total		952			1358	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1977 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		0
14. Safety Systems		3
15. Reactor Cooling Systems		6
16. Steam generation systems		15
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		101
32. Feedwater and Main Steam System		16
35. All other I&C Systems		2
41. Main Generator Systems		5
42. Electrical Power Supply Systems		51
XX. Miscellaneous Systems		1
Total	0	213

US-364 FARLEY-2

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 860.0 MW(e)
Design Net Capacity: 829.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6592.2 GW(e).h
Energy Availability Factor: 87.7%
Load Factor: 87.5%
Operating Factor: 87.7%
Energy Unavailability Factor: 12.3%
Total Off-line Time: 1078 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	646.8	585.9	641.6	54.0	221.8	620.5	638.7	638.4	621.5	646.4	627.0	649.5	6592.2
EAF (%)	100.0	100.0	100.0	10.0	42.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.7
UCF (%)	100.0	100.0	100.0	10.0	42.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.7
LF (%)	101.1	101.4	100.4	8.7	34.7	100.2	99.8	99.8	100.4	101.0	101.1	101.5	87.5
OF (%)	100.0	100.0	100.0	10.7	41.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	87.7
EUf (%)	0.0	0.0	0.0	90.0	57.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.3
PUf (%)	0.0	0.0	0.0	90.0	53.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
UCLF (%)	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1970
Date of First Criticality: 05 May 1981
Date of Grid Connection: 25/05/1981
Date of Commercial Operation: 30/07/1981

Lifetime Generation: 183816.9 GW(e).h
Cumulative Energy Availability Factor: 87.5%
Cumulative Load Factor: 85.3%
Cumulative Unit Capability Factor: 87.6%
Cumulative Energy Unavailability Factor: 12.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	2920.8	825	95.3	95.3	95.3	95.3	80.1	80.1	3665	83.0
1982	5311.3	814	79.4	84.8	79.4	84.8	74.5	76.4	6931	79.1
1983	5984.1	814	87.7	86.0	87.7	86.0	83.9	79.4	7696	87.9
1984	6618.9	814	94.4	88.4	94.2	88.3	92.6	83.1	8276	94.2
1985	5474.2	809	77.8	86.1	77.4	85.9	77.2	81.8	6813	77.8
1986	5959.9	829	85.2	85.9	85.2	85.8	82.1	81.9	7455	85.1
1987	4910.4	824	73.0	83.9	73.0	83.8	68.0	79.7	6396	73.0
1988	6550.4	823	100.0	86.1	100.0	86.0	90.6	81.2	8039	91.5
1989	5621.6	830	80.5	85.4	80.5	85.3	77.3	80.7	7037	80.3
1990	5277.0	828	71.8	84.0	71.8	83.9	72.8	79.9	6478	73.9
1991	6739.9	824	96.0	85.1	95.6	85.0	93.4	81.2	8376	95.6
1992	5409.9	824	79.5	84.6	79.5	84.5	74.7	80.6	6987	79.5
1993	5248.5	822	75.8	83.9	75.8	83.8	72.9	80.0	6644	75.8
1994	7147.2	822	98.9	85.0	98.9	84.9	99.3	81.4	8660	98.9
1995	5091.4	822	79.7	84.7	79.7	84.6	70.7	80.7	6984	79.7
1996	5741.3	822	81.5	84.4	81.5	84.4	79.5	80.6	7160	81.5
1997	7280.9	822	100.0	85.4	100.0	85.3	101.1	81.8	8760	100.0
1998	6271.4	824	85.8	85.4	85.8	85.4	86.8	82.1	7514	85.8
1999	5356.2	852	82.7	85.3	82.7	85.2	71.8	81.6	7242	82.7
2000	7362.6	839	99.4	86.0	99.4	85.9	99.9	82.5	8736	99.5
2001	5777.7	842	79.0	85.7	79.0	85.6	78.3	82.3	6921	79.0
2002	6463.4	842	87.7	85.8	87.7	85.7	87.6	82.6	7682	87.7
2003	7379.4	839	99.2	86.4	99.2	86.3	100.4	83.4	8687	99.2
2004	6724.1	849	90.5	86.5	90.5	86.5	90.7	83.7	7949	90.5
2005	6351.7	842	86.4	86.5	86.4	86.5	86.1	83.8	7566	86.4
2006	7620.3	860	100.0	87.1	100.0	87.0	101.2	84.5	8760	100.0
2007	6572.1	860	87.5	87.1	87.5	87.1	87.2	84.6	7660	87.4
2008	6795.5	860	90.5	87.2	90.5	87.2	90.0	84.8	7956	90.6
2009	7262.5	860	96.2	87.5	96.2	87.5	96.4	85.2	8427	96.2
2010	6592.2	860	87.7	87.6	87.7	87.5	87.5	85.3	7682	87.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		29			153	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	1047			832		
D. Inspection, maintenance or repair without refuelling				23		
E. Testing of plant systems or components				7		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				8	4	2
L. Human factor related					1	
Subtotal	1047	29	0	870	169	2
Total		1076			1041	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		9
14. Safety Systems		18
15. Reactor Cooling Systems		42
16. Steam generation systems		24
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		14
32. Feedwater and Main Steam System	29	6
35. All other I&C Systems		0
41. Main Generator Systems		4
42. Electrical Power Supply Systems		4
Total	29	141

US-333 FITZPATRICK

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 855.0 MW(e)
Design Net Capacity: 821.0 MW(e)
Design Discharge Burnup: 31800 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6361.5 GW(e).h
Energy Availability Factor: 90.3%
Load Factor: 84.9%
Operating Factor: 90.3%
Energy Unavailability Factor: 9.7%
Total Off-line Time: 852 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	632.3	540.7	627.2	564.1	618.8	594.7	603.5	551.3	200.9	261.8	536.7	629.6	6361.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	36.7	47.0	100.0	100.0	90.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	36.7	47.0	100.0	100.0	90.3
LF (%)	99.4	94.1	98.7	91.6	97.3	96.6	94.9	86.7	32.6	41.2	87.1	99.0	84.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.4	46.1	100.0	100.0	90.3
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.3	53.0	0.0	0.0	9.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.3	53.0	0.0	0.0	9.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Jan 1968
Date of First Criticality: 17/11/1974
Date of Grid Connection: 02 Jan 1975
Date of Commercial Operation: 28/07/1975

Lifetime Generation: 186092.3 GW(e).h
Cumulative Energy Availability Factor: 77.8%
Cumulative Load Factor: 74.6%
Cumulative Unit Capability Factor: 77.9%
Cumulative Energy Unavailability Factor: 22.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1975	1824.1	819	100.0	100.0	100.0	100.0	50.3	50.3	3230	73.1
1976	4156.4	670	70.5	81.7	70.5	81.7	70.6	62.9	6284	71.5
1977	3893.4	770	57.7	71.8	57.7	71.8	57.7	60.7	5986	68.3
1978	4197.4	800	59.9	68.2	59.9	68.2	59.9	60.5	6311	72.0
1979	2964.7	800	42.3	62.2	42.3	62.2	42.3	56.3	4450	50.8
1980	4334.1	802	71.0	63.9	70.4	63.7	61.5	57.3	6162	70.2
1981	4779.7	810	74.7	65.6	74.7	65.5	67.4	58.9	6539	74.6
1982	4959.7	810	75.3	66.9	75.3	66.9	69.9	60.4	6570	75.0
1983	4634.3	810	70.7	67.4	70.7	67.3	65.3	61.0	6183	70.6
1984	4899.4	810	76.9	68.4	76.9	68.3	68.9	61.8	6745	76.8
1985	4166.5	810	64.1	68.0	64.1	67.9	58.7	61.5	5576	63.7
1986	6015.6	797	90.5	70.0	90.5	69.9	86.1	63.7	7931	90.5
1987	4198.3	795	67.1	69.7	67.1	69.7	60.3	63.4	5891	67.2
1988	4356.9	780	66.5	69.5	66.5	69.5	63.5	63.4	5844	66.5
1989	6155.3	757	90.3	70.9	90.3	70.8	92.8	65.4	7944	90.7
1990	4601.9	782	68.4	70.7	68.4	70.7	67.2	65.5	6045	69.0
1991	3376.8	780	56.0	69.8	56.0	69.8	49.4	64.5	4534	51.8
1992	0.0	780	0.0	65.9	0.0	65.8	0.0	60.9	0	0.0
1993	4746.5	780	71.6	66.2	71.6	66.1	69.5	61.3	6301	71.9
1994	4972.6	774	81.9	67.0	81.9	66.9	73.3	61.9	7224	82.5
1995	4804.0	777	71.6	67.2	71.6	67.2	70.5	62.3	6336	72.3
1996	5290.4	765	79.3	67.7	79.3	67.7	78.6	63.1	7036	80.1
1997	6624.6	799	96.3	69.0	94.9	68.9	94.6	64.5	8310	94.9
1998	4930.5	785	75.2	69.3	75.2	69.2	71.7	64.8	6613	75.5
1999	6567.4	799	93.5	70.3	93.5	70.2	93.7	66.0	8205	93.7
2000	6024.8	813	86.6	71.0	86.6	70.9	84.4	66.8	7617	86.7
2001	7090.5	813	98.6	72.0	98.6	72.0	99.6	68.0	8639	98.6
2002	6595.0	813	92.4	72.8	92.4	72.7	92.6	69.0	8112	92.6
2003	6966.0	813	96.2	73.6	96.2	73.6	97.8	70.0	8435	96.3
2004	6455.9	813	90.8	74.2	90.8	74.2	90.4	70.7	7984	90.9
2005	7052.3	825	95.9	75.0	95.9	74.9	97.6	71.6	8403	95.9
2006	6758.7	852	92.6	75.6	92.6	75.5	90.6	72.3	8108	92.6
2007	6918.4	852	97.8	76.3	95.0	76.2	92.7	72.9	8318	95.0
2008	6691.0	852	92.3	76.8	92.3	76.7	89.4	73.5	8105	92.3
2009	7398.1	854	100.0	77.5	100.0	77.4	98.9	74.3	8760	100.0
2010	6361.5	855	90.3	77.9	90.3	77.8	84.9	74.6	7908	90.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					389	
B. Refuelling without a maintenance					52	
C. Inspection, maintenance or repair combined with refuelling	851			1075		
D. Inspection, maintenance or repair without refuelling				222		
E. Testing of plant systems or components				2	1	
H. Nuclear regulatory requirements					10	118
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				4	21	3
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						6
Subtotal	851	0	0	1303	473	129
Total		851			1905	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		15
13. Reactor Auxiliary Systems		7
14. Safety Systems		79
15. Reactor Cooling Systems		51
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		60
32. Feedwater and Main Steam System		38
35. All other I&C Systems		5
41. Main Generator Systems		20
42. Electrical Power Supply Systems		45
XX. Miscellaneous Systems		18
Total	0	340

US-285 FORT CALHOUN-1

Operator: OPPD (OMAHA PUBLIC POWER DISTRICT)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 478.0 MW(e)
 Design Net Capacity: 478.0 MW(e)
 Design Discharge Burnup: 13500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4261.5 GW(e).h
 Energy Availability Factor: 99.0%
 Load Factor: 101.8%
 Operating Factor: 98.4%
 Energy Unavailability Factor: 1.0%
 Total Off-line Time: 141 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	376.3	339.0	373.6	306.5	356.7	352.8	360.2	359.9	356.9	372.4	365.8	341.4	4261.5
EAF (%)	100.0	100.0	100.0	87.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0
UCF (%)	100.0	100.0	100.0	87.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0
LF (%)	105.8	105.5	105.2	89.1	100.3	102.5	101.3	101.2	103.7	104.7	106.1	96.0	101.8
OF (%)	100.0	100.0	100.0	87.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.7	98.4
EUF (%)	0.0	0.0	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	12.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jul 1968
 Date of First Criticality: 08 Jun 1973
 Date of Grid Connection: 25/08/1973
 Date of Commercial Operation: 26/09/1973
 Lifetime Generation: 118514.3 GW(e).h
 Cumulative Energy Availability Factor: 80.9%
 Cumulative Load Factor: 76.5%
 Cumulative Unit Capability Factor: 80.9%
 Cumulative Energy Unavailability Factor: 19.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	601.4	468	96.2	96.2	96.2	96.2	44.9	44.9	2642	90.2
1974	2416.3	457	83.5	86.7	83.5	86.7	60.4	56.5	7304	83.4
1975	2080.8	457	52.0	71.8	52.0	71.8	52.0	54.6	5905	67.4
1976	2195.5	443	56.5	67.3	56.5	67.3	56.4	55.1	6101	69.5
1977	2922.7	444	75.1	69.1	75.1	69.1	75.1	59.7	6958	79.4
1978	2849.4	456	71.4	69.5	71.4	69.5	71.3	61.9	6580	75.1
1979	3666.1	457	91.6	73.0	91.6	73.0	91.6	66.6	8382	95.7
1980	2010.3	465	59.7	71.2	59.7	71.2	49.2	64.2	5307	60.4
1981	2149.7	480	72.7	71.4	72.7	71.4	51.1	62.5	6327	72.2
1982	3482.1	478	89.8	73.4	89.8	73.4	83.2	64.8	7856	89.7
1983	2749.9	461	73.1	73.4	73.1	73.4	68.1	65.1	6404	73.1
1984	2331.8	478	60.1	72.2	60.1	72.2	55.5	64.3	5262	59.9
1985	3066.3	478	73.7	72.3	73.7	72.3	73.2	65.0	6454	73.7
1986	3605.6	478	94.3	74.0	94.3	74.0	86.1	66.6	8263	94.3
1987	3060.6	478	74.7	74.0	74.7	74.0	73.1	67.1	6531	74.6
1988	2627.4	478	74.0	74.0	74.0	74.0	62.6	66.8	6496	74.0
1989	3296.0	478	87.8	74.9	87.8	74.9	78.7	67.5	7589	86.6
1990	2417.2	478	62.1	74.1	62.1	74.1	57.7	67.0	5420	61.9
1991	3249.0	478	92.9	75.2	92.9	75.2	77.6	67.6	7946	90.7
1992	2537.1	478	64.9	74.6	64.9	74.6	60.4	67.2	5683	64.7
1993	3102.2	478	80.0	74.9	80.0	74.9	74.1	67.5	6996	79.9
1994	4118.7	478	99.5	76.1	99.5	76.1	98.4	69.0	8711	99.4
1995	3365.6	478	82.4	76.4	82.4	76.4	80.4	69.5	7204	82.2
1996	3128.7	478	78.5	76.5	78.5	76.5	74.5	69.7	6886	78.4
1997	3818.2	478	92.9	77.2	92.9	77.2	91.2	70.6	8131	92.8
1998	3396.6	478	82.2	77.4	82.2	77.4	81.1	71.1	7195	82.1
1999	3584.4	478	88.9	77.8	88.9	77.8	85.6	71.6	7785	88.9
2000	3898.1	478	93.2	78.4	93.2	78.4	92.8	72.4	8185	93.2
2001	3524.1	478	88.0	78.7	88.0	78.7	84.2	72.8	7702	87.9
2002	3808.5	478	92.1	79.2	92.1	79.2	91.0	73.4	8061	92.0
2003	3510.1	478	86.8	79.4	86.8	79.4	83.8	73.8	7596	86.7
2004	4071.3	478	96.8	80.0	96.8	80.0	97.0	74.5	8503	96.8
2005	2919.6	476	71.7	79.7	71.7	79.7	70.0	74.4	6277	71.6
2006	3100.5	478	74.8	79.6	74.8	79.6	74.0	74.4	6553	74.8
2007	4370.3	482	100.0	80.2	100.0	80.2	103.5	75.3	8760	100.0
2008	3517.2	482	81.9	80.2	81.9	80.2	83.1	75.5	7195	81.9
2009	3702.3	482	86.5	80.4	86.5	80.4	87.7	75.8	7579	86.5
2010	4261.5	478	99.0	80.9	99.0	80.9	101.8	76.5	8619	98.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		86			166	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				1259		
D. Inspection, maintenance or repair without refuelling				71	12	
E. Testing of plant systems or components				26		
G. Major back-fitting, refurbishment or upgrading activities without refuelling						0
H. Nuclear regulatory requirements						4
J. Grid limitation, failure or grid unavailability			53			
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				4	14	0
Subtotal	0	86	53	1360	193	4
Total		139			1557	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		10
13. Reactor Auxiliary Systems		6
14. Safety Systems		13
15. Reactor Cooling Systems		52
16. Steam generation systems		4
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		14
42. Electrical Power Supply Systems		35
XX. Miscellaneous Systems	86	6
Total	86	160

US-416 GRAND GULF-1

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1251.0 MW(e)
Design Net Capacity: 1250.0 MW(e)
Design Discharge Burnup: 28000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9643.2 GW(e).h
Energy Availability Factor: 90.3%
Load Factor: 88.0%
Operating Factor: 90.3%
Energy Unavailability Factor: 9.7%
Total Off-line Time: 848 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	927.0	838.1	720.7	641.3	103.2	899.6	927.2	915.6	902.6	932.9	903.9	931.0	9643.2
EAF (%)	100.0	100.0	86.7	79.9	18.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.3
UCF (%)	100.0	100.0	86.7	79.9	18.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.3
LF (%)	99.6	99.7	77.5	71.2	11.1	99.9	99.6	98.4	100.2	100.2	100.2	100.0	88.0
OF (%)	100.0	100.0	86.7	82.8	16.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.3
EUF (%)	0.0	0.0	13.3	20.1	81.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7
PUF (%)	0.0	0.0	0.0	20.1	81.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6
UCLF (%)	0.0	0.0	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 05 Apr 1974
Date of First Criticality: 18/08/1982
Date of Grid Connection: 20/10/1984
Date of Commercial Operation: 07 Jan 1985

Lifetime Generation: 233551.2 GW(e).h
Cumulative Energy Availability Factor: 87.2%
Cumulative Load Factor: 87.1%
Cumulative Unit Capability Factor: 87.4%
Cumulative Energy Unavailability Factor: 12.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	2654.1	1108	58.7	58.7	58.7	58.7	54.2	54.2	2691	60.9
1986	4098.1	1108	60.5	59.9	60.5	59.9	42.2	46.2	5326	60.8
1987	7727.0	1130	80.9	68.4	80.9	68.4	78.0	59.1	7098	81.0
1988	9591.0	1142	93.8	75.8	93.8	75.8	95.6	69.7	8250	93.9
1989	7846.3	1142	76.9	76.0	76.9	76.0	78.4	71.7	6815	77.8
1990	7404.0	1142	76.6	76.1	76.6	76.1	74.0	72.1	6765	77.2
1991	9118.7	1142	89.6	78.2	88.4	78.0	91.1	75.0	8035	91.7
1992	8171.1	1143	81.1	78.6	81.1	78.4	81.4	75.9	7163	81.5
1993	7898.5	1143	77.6	78.5	77.6	78.3	78.9	76.2	6845	78.1
1994	9614.8	1143	94.5	80.2	94.5	80.1	96.0	78.3	8284	94.6
1995	7809.7	1153	77.7	79.9	77.7	79.8	77.3	78.2	6829	78.0
1996	9224.7	1175	87.7	80.6	87.7	80.5	89.3	79.2	7696	87.6
1997	10817.6	1200	100.0	82.3	100.0	82.2	102.9	81.2	8760	100.0
1998	9190.8	1200	87.5	82.7	87.5	82.6	87.4	81.7	7641	87.2
1999	8428.4	1204	79.3	82.4	79.3	82.3	79.9	81.6	6944	79.3
2000	10694.6	1208	99.2	83.6	98.3	83.4	100.7	82.9	8634	98.3
2001	9924.0	1210	92.3	84.1	91.8	83.9	93.6	83.5	8040	91.8
2002	10059.5	1207	93.8	84.7	92.9	84.5	95.1	84.2	8139	92.9
2003	10902.5	1207	97.9	85.4	97.9	85.2	103.1	85.3	8574	97.9
2004	10235.1	1207	91.2	85.7	91.2	85.5	96.5	85.9	8047	91.6
2005	10077.8	1263	91.7	86.0	91.1	85.8	91.1	86.2	7974	91.0
2006	10807.3	1266	97.8	86.6	97.8	86.4	97.4	86.7	8570	97.8
2007	9358.8	1268	87.3	86.7	87.3	86.5	84.3	86.6	7643	87.2
2008	9417.1	1268	87.0	86.7	87.0	86.5	84.5	86.5	7637	86.9
2009	10998.5	1259	100.0	87.3	100.0	87.1	99.7	87.1	8760	100.0
2010	9643.2	1251	90.3	87.4	90.3	87.2	88.0	87.1	7912	90.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		98			213	
B. Refuelling without a maintenance					27	
C. Inspection, maintenance or repair combined with refuelling	748			645	17	
D. Inspection, maintenance or repair without refuelling				111	2	
E. Testing of plant systems or components				0	0	
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					32	11
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					5	1
Subtotal	748	98	0	756	297	12
Total		846			1065	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		5
13. Reactor Auxiliary Systems		22
14. Safety Systems		2
15. Reactor Cooling Systems		37
17. Safety I&C Systems (excluding reactor I&C)		11
31. Turbine and auxiliaries		31
32. Feedwater and Main Steam System	98	16
33. Circulating Water System		2
35. All other I&C Systems		5
41. Main Generator Systems		14
42. Electrical Power Supply Systems		37
XX. Miscellaneous Systems		24
Total	98	206

US-261 H.B. ROBINSON-2

Operator: PROGRESS (PROGRESS ENERGY)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF at the beginning of 2010): 724.0 MW(e)
 Design Net Capacity: 700.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3598.4 GW(e).h
 Energy Availability Factor: 56.8%
 Load Factor: 56.7%
 Operating Factor: 56.0%
 Energy Unavailability Factor: 43.2%
 Total Off-line Time: 3858 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	568.0	513.3	507.1	0.0	0.0	0.0	166.8	537.1	429.8	102.3	207.5	566.5	3598.4
EAF (%)	100.0	100.0	87.3	4.5	1.9	1.9	40.0	100.0	83.9	20.9	42.7	100.0	56.8
UCF (%)	100.0	100.0	87.3	4.5	1.9	1.9	40.0	100.0	83.9	20.9	42.7	100.0	56.8
LF (%)	105.5	105.5	94.3	0.0	0.0	0.0	31.0	99.7	82.5	19.0	39.8	105.2	56.7
OF (%)	100.0	100.0	89.5	0.0	0.0	0.0	38.7	100.0	83.6	19.4	41.5	100.0	56.0
EUf (%)	0.0	0.0	12.7	95.5	98.1	98.1	60.0	0.0	16.1	79.1	57.3	0.0	43.2
PUF (%)	0.0	0.0	0.0	45.8	98.1	98.1	60.0	0.0	0.0	0.0	0.0	0.0	25.2
UCLF (%)	0.0	0.0	12.7	49.7	0.0	0.0	0.0	0.0	16.1	79.1	57.3	0.0	17.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 13/04/1967
 Date of First Criticality: 20/09/1970
 Date of Grid Connection: 26/09/1970
 Date of Commercial Operation: 03 Jul 1971
 Lifetime Generation: 182066.0 GW(e).h
 Cumulative Energy Availability Factor: 78.5%
 Cumulative Load Factor: 76.0%
 Cumulative Unit Capability Factor: 78.6%
 Cumulative Energy Unavailability Factor: 21.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	2337.3	739	100.0	100.0	100.0	100.0	43.1	43.1	3534	48.1
1972	5082.4	739	100.0	100.0	100.0	100.0	78.3	62.3	7487	85.2
1973	3765.5	715	75.7	91.6	75.7	91.6	60.1	61.5	6591	75.2
1974	4813.1	700	83.3	89.5	83.3	89.5	78.5	65.8	7297	83.3
1975	4170.9	665	71.0	86.0	71.0	86.0	71.6	66.9	6316	72.1
1976	4874.2	667	82.5	85.4	82.5	85.4	83.2	69.6	7435	84.6
1977	4130.2	665	70.8	83.4	70.8	83.4	70.9	69.8	7462	85.2
1978	3980.0	665	68.2	81.5	68.2	81.5	68.3	69.6	6307	72.0
1979	4005.1	665	68.7	80.1	68.7	80.1	68.8	69.5	6172	70.5
1980	3210.9	665	61.9	78.3	61.9	78.3	55.0	68.1	5464	62.2
1981	3510.8	665	81.1	78.6	73.4	77.9	60.3	67.4	6391	73.0
1982	2268.4	665	47.9	76.0	47.9	75.4	38.9	65.0	4278	48.8
1983	3347.5	665	75.5	76.0	75.5	75.4	57.5	64.5	6609	75.4
1984	224.3	665	7.0	71.1	7.0	70.6	3.8	60.2	615	7.0
1985	5239.9	665	87.6	72.2	87.6	71.7	89.9	62.1	7697	87.9
1986	4799.6	665	79.7	72.7	79.7	72.2	82.4	63.4	7028	80.2
1987	4235.5	665	70.3	72.5	70.3	72.1	72.7	63.9	6224	71.1
1988	3182.4	665	64.2	72.1	64.2	71.7	54.5	63.4	5717	65.1
1989	2790.5	665	45.5	70.7	45.5	70.3	47.9	62.6	4107	46.9
1990	3319.2	665	63.1	70.3	63.1	69.9	57.0	62.3	5614	64.1
1991	4792.2	672	80.2	70.8	80.2	70.4	81.3	63.2	7048	80.5
1992	4062.9	683	66.2	70.6	66.2	70.2	67.7	63.4	5812	66.2
1993	4193.3	683	70.1	70.6	70.1	70.2	70.1	63.7	6137	70.1
1994	4655.1	683	78.2	70.9	78.2	70.6	77.8	64.3	6845	78.1
1995	5033.8	683	84.0	71.4	84.0	71.1	84.1	65.1	7356	84.0
1996	5460.1	683	88.2	72.1	88.2	71.8	91.0	66.1	7745	88.2
1997	6197.6	683	98.9	73.1	98.9	72.8	103.6	67.5	8662	98.9
1998	5505.6	683	88.5	73.6	88.5	73.4	92.0	68.4	7751	88.5
1999	5684.5	683	91.4	74.3	91.4	74.0	95.0	69.4	8009	91.4
2000	6237.1	683	99.6	75.1	99.6	74.9	104.0	70.5	8750	99.6
2001	5515.0	683	90.4	75.6	90.4	75.4	92.2	71.2	7919	90.4
2002	5606.1	683	90.9	76.1	90.9	75.9	93.7	71.9	7960	90.9
2003	6439.9	710	100.0	76.9	100.0	76.6	103.5	72.9	8760	100.0
2004	5742.2	710	88.9	77.2	88.9	77.0	92.1	73.5	7811	88.9
2005	5770.1	710	89.5	77.6	89.5	77.4	92.8	74.1	7839	89.5
2006	6442.7	710	99.4	78.2	99.4	78.0	103.6	75.0	8705	99.4
2007	5737.9	710	89.3	78.5	89.3	78.3	92.3	75.5	7825	89.3
2008	5429.3	710	84.0	78.7	84.0	78.5	87.1	75.8	7380	84.0
2009	6473.2	710	98.9	79.2	98.9	79.0	104.1	76.5	8667	98.9
2010	3598.4	724	56.8	78.6	56.8	78.5	56.7	76.0	4902	56.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		1600			489	
B. Refuelling without a maintenance					56	
C. Inspection, maintenance or repair combined with refuelling	2255			1122		
D. Inspection, maintenance or repair without refuelling				40		
E. Testing of plant systems or components				0	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				1		
H. Nuclear regulatory requirements					102	16
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					36	0
Subtotal	2255	1600	0	1163	683	16
Total		3855			1862	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		35
13. Reactor Auxiliary Systems		2
14. Safety Systems		34
15. Reactor Cooling Systems	1021	59
16. Steam generation systems		111
31. Turbine and auxiliaries	117	94
32. Feedwater and Main Steam System		37
35. All other I&C Systems		0
41. Main Generator Systems		0
42. Electrical Power Supply Systems	461	77
XX. Miscellaneous Systems		13
Total	1599	462

US-321 HATCH-1

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 876.0 MW(e)
Design Net Capacity: 777.0 MW(e)
Design Discharge Burnup: 17000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6509.9 GW(e).h
Energy Availability Factor: 87.8%
Load Factor: 84.8%
Operating Factor: 87.8%
Energy Unavailability Factor: 12.2%
Total Off-line Time: 1070 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	654.0	126.7	161.9	607.0	657.0	602.5	596.5	641.9	623.0	660.5	643.7	535.3	6509.9
EAF (%)	100.0	25.0	33.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.9	87.8
UCF (%)	100.0	25.0	33.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.9	87.8
LF (%)	100.3	21.5	24.9	96.2	100.8	95.5	91.5	98.5	98.8	101.3	101.9	82.1	84.8
OF (%)	100.0	25.0	33.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.9	87.8
EUF (%)	0.0	75.0	66.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	12.2
PUF (%)	0.0	75.0	66.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1	12.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 30/09/1968
Date of First Criticality: 09 Dec 1974
Date of Grid Connection: 11 Nov 1974
Date of Commercial Operation: 31/12/1975

Lifetime Generation: 192932.9 GW(e).h
Cumulative Energy Availability Factor: 80.7%
Cumulative Load Factor: 78.0%
Cumulative Unit Capability Factor: 80.7%
Cumulative Energy Unavailability Factor: 19.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1975	38.3	786	100.0	100.0	100.0	100.0	6.5	6.5	6.5	6.5	134	18.0
1976	4133.8	786	60.0	63.1	60.0	63.1	59.9	55.7	59.9	55.7	7299	83.1
1977	3716.7	700	60.2	61.8	60.2	61.8	60.6	57.9	60.6	57.9	5802	66.2
1978	4277.2	717	68.1	63.8	68.1	63.8	68.1	61.1	68.1	61.1	6370	72.7
1979	3349.5	739	51.7	60.8	51.7	60.8	51.7	58.8	51.7	58.8	4781	54.6
1980	4790.2	764	82.3	65.2	82.1	65.1	71.4	61.4	71.4	61.4	7174	81.7
1981	2770.7	757	50.6	62.7	50.6	62.7	41.8	58.1	41.8	58.1	4384	50.0
1982	2893.9	758	49.4	60.8	49.4	60.8	43.6	56.0	43.6	56.0	4313	49.2
1983	3968.9	764	71.5	62.2	71.5	62.2	59.3	56.4	59.3	56.4	6240	71.2
1984	3609.2	752	62.5	62.2	62.3	62.2	54.6	56.2	54.6	56.2	5473	62.3
1985	4761.4	752	76.5	63.6	76.5	63.6	72.3	57.8	72.3	57.8	6694	76.4
1986	3645.4	768	59.0	63.2	59.0	63.2	54.2	57.5	54.2	57.5	5162	58.9
1987	5080.7	750	80.4	64.6	80.4	64.6	77.3	59.1	77.3	59.1	7043	80.4
1988	4115.8	756	66.0	64.7	66.0	64.7	62.0	59.4	62.0	59.4	5802	66.1
1989	6479.7	757	100.0	67.3	100.0	67.2	97.7	62.1	97.7	62.1	8760	100.0
1990	4103.4	753	65.1	67.1	65.1	67.1	62.2	62.1	62.2	62.1	5722	65.3
1991	4707.5	741	74.6	67.6	74.0	67.5	72.5	62.7	72.5	62.7	6530	74.5
1992	6157.2	741	96.1	69.2	96.1	69.2	94.6	64.6	94.6	64.6	8444	96.1
1993	4956.7	737	78.4	69.7	78.4	69.7	76.8	65.2	76.8	65.2	6913	78.9
1994	5512.2	741	85.8	70.6	85.8	70.5	84.9	66.3	84.9	66.3	7542	86.1
1995	6465.8	741	100.0	72.0	100.0	71.9	99.6	67.9	99.6	67.9	8760	100.0
1996	5726.7	788	87.8	72.8	87.8	72.7	82.6	68.6	82.6	68.6	7666	87.3
1997	6009.0	800	87.9	73.5	87.9	73.5	85.7	69.5	85.7	69.5	7637	87.2
1998	6951.8	800	99.9	74.7	99.9	74.7	99.2	70.8	99.2	70.8	8751	99.9
1999	5968.8	808	82.2	75.1	82.2	75.0	84.3	71.4	84.3	71.4	7153	81.7
2000	6413.4	860	86.2	75.6	86.2	75.5	84.8	72.0	84.8	72.0	7530	85.7
2001	7496.2	863	99.1	76.6	99.1	76.5	99.2	73.2	99.2	73.2	8689	99.2
2002	6627.1	856	88.8	77.1	88.8	77.0	88.4	73.8	88.4	73.8	7778	88.8
2003	7146.9	856	96.3	77.8	96.3	77.8	95.3	74.7	95.3	74.7	8438	96.3
2004	6896.1	869	91.7	78.4	91.7	78.3	90.8	75.3	90.8	75.3	8046	91.6
2005	6993.5	856	92.7	78.9	92.7	78.9	93.3	75.9	93.3	75.9	8121	92.7
2006	6422.8	849	85.4	79.1	85.4	79.1	86.3	76.3	86.3	76.3	7516	85.8
2007	7499.1	876	97.6	79.8	97.6	79.7	97.7	77.1	97.7	77.1	8550	97.6
2008	6433.7	876	85.7	80.0	85.7	79.9	83.6	77.3	83.6	77.3	7527	85.7
2009	7190.0	876	94.6	80.4	94.6	80.4	93.7	77.8	93.7	77.8	8289	94.6
2010	6509.9	876	87.8	80.7	87.8	80.7	84.8	78.0	84.8	78.0	7690	87.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					345	0
B. Refuelling without a maintenance					19	
C. Inspection, maintenance or repair combined with refuelling	1000			1079		
D. Inspection, maintenance or repair without refuelling	67			104	0	
E. Testing of plant systems or components	0			0	2	
H. Nuclear regulatory requirements						0
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				3	47	
P. Fire					11	
Subtotal	1067	0	0	1186	424	1
Total		1067			1611	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		18
13. Reactor Auxiliary Systems		42
14. Safety Systems		32
15. Reactor Cooling Systems		46
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		65
32. Feedwater and Main Steam System		61
33. Circulating Water System		1
35. All other I&C Systems		8
41. Main Generator Systems		28
42. Electrical Power Supply Systems		18
XX. Miscellaneous Systems		8
Total	0	330

US-366 HATCH-2

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 883.0 MW(e)
Design Net Capacity: 784.0 MW(e)
Design Discharge Burnup: 18750 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7391.7 GW(e).h
Energy Availability Factor: 96.5%
Load Factor: 95.6%
Operating Factor: 96.5%
Energy Unavailability Factor: 3.5%
Total Off-line Time: 304 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	662.3	586.4	669.0	319.1	656.4	633.8	642.1	641.9	634.9	633.6	645.7	666.6	7391.7
EAF (%)	100.0	100.0	100.0	57.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.5
UCF (%)	100.0	100.0	100.0	57.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.5
LF (%)	100.8	98.8	102.0	50.2	99.9	99.7	97.7	97.7	99.9	96.4	101.4	101.5	95.6
OF (%)	100.0	100.0	100.0	57.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.5
EUUF (%)	0.0	0.0	0.0	42.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
PUF (%)	0.0	0.0	0.0	42.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 02 Jan 1972
Date of First Criticality: 07 Apr 1978
Date of Grid Connection: 22/09/1978
Date of Commercial Operation: 09 May 1979

Lifetime Generation: 177902.6 GW(e).h
Cumulative Energy Availability Factor: 82.6%
Cumulative Load Factor: 79.1%
Cumulative Unit Capability Factor: 82.7%
Cumulative Energy Unavailability Factor: 17.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1979	1757.0	749	100.0	100.0	100.0	100.0	80.1	80.1	2480	84.7
1980	3653.1	767	61.0	70.6	59.1	69.2	54.2	60.6	5269	60.0
1981	4481.5	772	78.7	74.1	78.7	73.3	66.3	63.0	6872	78.4
1982	3734.2	771	63.9	71.0	63.9	70.5	55.3	60.7	5588	63.8
1983	3817.2	771	66.1	69.9	66.1	69.5	56.5	59.7	5774	65.9
1984	1893.5	748	26.7	62.0	26.7	61.6	28.8	54.1	2833	32.3
1985	5376.1	748	82.6	65.2	82.6	64.9	82.0	58.4	7239	82.6
1986	3618.7	777	70.4	65.9	70.4	65.6	53.2	57.7	6169	70.4
1987	5755.6	761	95.7	69.4	95.7	69.2	86.3	61.1	8388	95.8
1988	4254.5	768	65.7	69.0	65.7	68.8	63.1	61.3	5917	67.4
1989	4147.2	768	68.6	69.0	68.6	68.8	61.6	61.3	6155	70.3
1990	6527.8	766	98.7	71.6	98.7	71.5	97.3	64.5	8649	98.7
1991	4932.2	761	74.4	71.8	74.4	71.7	74.0	65.3	6656	76.0
1992	4692.4	764	74.5	72.0	74.5	71.9	69.9	65.6	6668	75.9
1993	4999.7	757	87.4	73.1	87.4	73.0	75.4	66.3	7734	88.3
1994	5275.6	765	85.2	73.9	85.2	73.8	78.7	67.1	7534	86.0
1995	5055.5	768	77.4	74.1	77.4	74.0	75.1	67.6	6888	78.6
1996	7021.7	809	98.4	75.6	98.4	75.5	98.8	69.5	8639	98.3
1997	6033.6	818	86.4	76.2	86.4	76.1	84.2	70.4	7560	86.3
1998	5829.9	821	82.8	76.6	82.8	76.5	81.0	70.9	7247	82.7
1999	7073.6	855	93.3	77.5	93.3	77.4	94.4	72.2	8173	93.3
2000	6900.3	873	89.6	78.1	89.6	78.0	89.9	73.1	7884	89.8
2001	6584.5	878	86.3	78.5	86.3	78.5	85.6	73.8	7618	87.0
2002	7423.3	870	97.3	79.4	97.3	79.3	97.4	74.9	8544	97.5
2003	6962.5	883	91.9	80.0	91.9	79.9	91.1	75.6	8052	91.9
2004	7520.6	883	97.8	80.8	97.8	80.7	97.0	76.6	8589	97.8
2005	6727.8	883	88.2	81.1	88.2	81.0	87.0	77.0	7724	88.2
2006	7641.8	883	99.3	81.8	99.3	81.7	98.8	77.9	8694	99.2
2007	6749.0	883	88.4	82.1	88.4	82.0	87.3	78.2	7744	88.4
2008	7479.8	883	97.0	82.6	97.0	82.6	96.4	78.9	8516	96.9
2009	5218.5	883	69.9	82.2	69.9	82.1	67.5	78.5	6119	69.9
2010	7391.7	883	96.5	82.7	96.5	82.6	95.6	79.1	8456	96.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					213	
B. Refuelling without a maintenance					40	
C. Inspection, maintenance or repair combined with refuelling				1058		
D. Inspection, maintenance or repair without refuelling	302			123	2	
E. Testing of plant systems or components	0			9	81	
H. Nuclear regulatory requirements				2		4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	37	
Subtotal	302	0	0	1192	373	4
Total		302			1569	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		16
14. Safety Systems		5
15. Reactor Cooling Systems		48
21. Fuel Handling and Storage Facilities		24
31. Turbine and auxiliaries		27
32. Feedwater and Main Steam System		38
33. Circulating Water System		1
41. Main Generator Systems		27
42. Electrical Power Supply Systems		12
Total	0	203

US-354 HOPE CREEK-1

Operator: PSEG (PSEG Nuclear LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1161.0 MW(e)
 Design Net Capacity: 1067.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9438.5 GW(e).h
 Energy Availability Factor: 91.4%
 Load Factor: 92.6%
 Operating Factor: 91.3%
 Energy Unavailability Factor: 8.6%
 Total Off-line Time: 759 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	765.4	809.0	911.8	877.4	895.3	822.1	831.7	844.9	838.2	408.1	510.7	924.0	9438.5
EAF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	45.2	66.2	100.0	91.4
UCF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	45.2	66.2	100.0	91.4
LF (%)	88.6	103.7	105.7	105.0	103.7	98.3	96.3	97.8	100.3	47.2	61.0	104.3	92.6
OF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	47.8	63.2	100.0	91.3
EUf (%)	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.8	33.8	0.0	8.6
PUf (%)	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	54.8	33.8	0.0	8.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 03 Jan 1976
 Date of First Criticality: 28/06/1986
 Date of Grid Connection: 08 Jan 1986
 Date of Commercial Operation: 20/12/1986
 Lifetime Generation: 186650.6 GW(e).h
 Cumulative Energy Availability Factor: 86.0%
 Cumulative Load Factor: 84.1%
 Cumulative Unit Capability Factor: 86.0%
 Cumulative Energy Unavailability Factor: 14.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986			Data not provided							
1987	7308.7	1067	92.7	92.7	92.7	92.7	78.2	78.2	7457	85.1
1988	6470.9	1061	79.0	85.9	79.0	85.9	69.4	73.8	6369	72.5
1989	6614.3	1031	76.7	82.9	76.7	82.9	73.2	73.6	6717	76.7
1990	8100.1	1031	90.7	84.8	90.7	84.8	89.7	77.6	7940	90.6
1991	7402.7	1031	83.1	84.5	83.1	84.5	82.0	78.4	7280	83.1
1992	7059.1	1031	78.9	83.5	78.9	83.5	77.9	78.4	6930	78.9
1993	8825.3	1031	97.4	85.5	97.4	85.5	97.7	81.1	8526	97.3
1994	7125.6	1031	79.6	84.8	79.6	84.8	78.9	80.8	6969	79.6
1995	7072.3	1031	79.2	84.2	79.2	84.2	78.3	80.5	6937	79.2
1996	6770.7	1031	75.4	83.3	75.4	83.3	74.8	80.0	6618	75.3
1997	6417.8	1031	74.3	82.5	74.3	82.5	71.1	79.2	6511	74.3
1998	8700.4	1031	97.5	83.7	97.5	83.7	96.3	80.6	8539	97.5
1999	7701.1	1031	86.1	83.9	86.1	83.9	85.3	80.9	7538	86.1
2000	7271.7	1031	82.6	83.8	82.6	83.8	80.3	80.9	7259	82.6
2001	8065.3	1049	89.8	84.2	89.8	84.2	88.7	81.4	7859	89.7
2002	8843.1	1049	97.7	85.0	97.7	85.0	96.2	82.4	8555	97.7
2003	7260.6	1049	81.5	84.8	81.5	84.8	79.0	82.2	7137	81.5
2004	6048.9	1049	69.7	84.0	69.7	84.0	65.6	81.2	6123	69.7
2005	7684.8	1049	84.2	84.0	84.2	84.0	83.6	81.4	7379	84.2
2006	8617.8	1059	91.8	84.4	91.8	84.4	92.9	81.9	8042	91.8
2007	8104.5	1061	88.8	84.6	88.8	84.6	87.2	82.2	7774	88.7
2008	10006.3	1186	99.7	85.4	99.7	85.4	100.4	83.1	8756	99.7
2009	9700.3	1161	92.4	85.7	92.4	85.7	95.4	83.7	8104	92.5
2010	9438.5	1191	91.4	86.0	91.4	86.0	92.6	84.1	8001	91.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					246	
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling	652			825		
D. Inspection, maintenance or repair without refuelling	105			112		
E. Testing of plant systems or components				0	4	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
L. Human factor related					1	
Subtotal	757	0	0	937	272	0
Total		757			1209	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		12
12. Reactor I&C Systems		9
13. Reactor Auxiliary Systems		30
15. Reactor Cooling Systems		37
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		52
32. Feedwater and Main Steam System		34
33. Circulating Water System		2
41. Main Generator Systems		21
42. Electrical Power Supply Systems		31
XX. Miscellaneous Systems		1
Total	0	231

US-247 INDIAN POINT-2

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 1022.0 MW(e)
 Design Net Capacity: 873.0 MW(e)
 Design Discharge Burnup: 36000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7325.9 GW(e).h
 Energy Availability Factor: 82.9%
 Load Factor: 81.8%
 Operating Factor: 83.0%
 Energy Unavailability Factor: 17.1%
 Total Off-line Time: 1493 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	711.4	692.2	216.5	427.9	764.9	727.8	744.6	744.8	440.8	764.9	329.6	760.6	7325.9
EAF (%)	96.1	100.0	28.7	62.8	100.0	100.0	100.0	100.0	61.7	100.0	45.7	100.0	82.9
UCF (%)	96.1	100.0	28.7	62.8	100.0	100.0	100.0	100.0	61.7	100.0	45.7	100.0	82.9
LF (%)	93.6	100.8	28.5	58.1	100.6	98.9	97.9	98.0	59.9	100.6	44.7	100.0	81.8
OF (%)	96.0	100.0	29.1	62.6	100.0	100.0	100.0	100.0	61.7	100.0	45.8	100.0	83.0
EUf (%)	3.9	0.0	71.3	37.2	0.0	0.0	0.0	0.0	38.3	0.0	54.3	0.0	17.1
PUF (%)	0.0	0.0	71.3	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
UCLF (%)	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.3	0.0	54.3	0.0	8.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 14/10/1966
 Date of First Criticality: 22/05/1973
 Date of Grid Connection: 26/06/1973
 Date of Commercial Operation: 08 Jan 1974
 Lifetime Generation: 210358.3 GW(e).h
 Cumulative Energy Availability Factor: 73.0%
 Cumulative Load Factor: 71.3%
 Cumulative Unit Capability Factor: 73.1%
 Cumulative Energy Unavailability Factor: 27.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	2037.0	873	79.8	79.8	79.8	79.8	63.5	63.5	2933	79.9
1975	4646.0	865	61.3	66.8	61.3	66.8	61.3	62.0	6545	74.7
1976	2287.1	864	30.2	51.7	30.2	51.7	30.1	48.8	3054	34.8
1977	5210.3	864	68.9	56.7	68.9	56.7	68.8	54.7	6626	75.6
1978	4372.9	859	58.2	57.0	58.2	57.0	58.1	55.4	5503	62.8
1979	4808.4	856	64.1	58.3	64.1	58.3	64.1	57.0	6156	70.3
1980	4273.2	856	66.8	59.6	63.9	59.2	56.8	57.0	5689	64.8
1981	3065.0	856	44.9	57.7	44.9	57.3	40.9	54.8	4027	46.0
1982	4458.6	862	65.0	58.5	65.0	58.2	59.0	55.3	5726	65.4
1983	5895.3	859	83.5	61.2	83.5	60.9	78.3	57.8	7354	83.9
1984	2891.6	864	48.4	59.9	48.4	59.7	38.1	55.9	4552	51.8
1985	6665.0	855	95.5	63.0	95.5	62.8	89.0	58.8	8382	95.7
1986	3827.4	855	52.6	62.2	52.6	62.0	51.1	58.1	4924	56.2
1987	5149.6	852	69.8	62.8	69.8	62.5	68.9	58.9	6331	72.3
1988	6064.0	856	81.0	64.0	81.0	63.8	80.6	60.4	7247	82.5
1989	4476.9	856	60.4	63.8	60.4	63.6	59.7	60.4	5556	63.4
1990	5222.1	886	64.3	63.8	64.3	63.6	67.2	60.8	5779	66.0
1991	3873.4	929	51.2	63.0	51.2	62.9	47.6	60.0	4495	51.3
1992	7880.6	939	96.7	65.0	96.7	64.9	95.5	62.1	8494	96.7
1993	5931.7	941	75.3	65.6	75.3	65.4	72.0	62.6	6570	75.0
1994	7634.6	941	100.0	67.4	100.0	67.3	92.6	64.2	8760	100.0
1995	4896.9	941	63.6	67.2	63.6	67.1	59.4	64.0	5533	63.2
1996	7831.8	941	94.2	68.5	94.2	68.4	94.7	65.4	8261	94.0
1997	3179.7	936	41.7	67.3	41.7	67.2	38.8	64.2	3639	41.5
1998	2512.5	932	30.9	65.7	30.9	65.6	30.8	62.8	2698	30.8
1999	7300.4	937	87.6	66.6	87.6	66.5	88.9	63.9	7665	87.5
2000	1062.3	941	12.5	64.5	12.5	64.4	12.9	61.8	1099	12.5
2001	7792.7	951	96.2	65.7	96.2	65.6	94.5	63.1	8429	96.2
2002	7556.6	951	90.2	66.6	90.2	66.5	91.7	64.1	7931	90.5
2003	8370.8	956	98.1	67.7	98.1	67.6	100.3	65.5	8597	98.1
2004	7513.1	956	89.3	68.5	89.3	68.4	89.5	66.3	7851	89.4
2005	8847.1	965	99.7	69.6	99.7	69.5	104.6	67.6	8730	99.6
2006	7984.7	1020	90.6	70.3	90.6	70.2	89.4	68.4	7937	90.6
2007	8842.6	1020	99.1	71.3	99.1	71.2	99.0	69.4	8679	99.1
2008	8205.2	1020	92.1	71.9	92.1	71.9	91.6	70.1	8088	92.1
2009	8837.4	1025	99.0	72.8	99.0	72.7	98.4	71.0	8667	98.9
2010	7325.9	1022	82.9	73.1	82.9	73.0	81.8	71.3	7267	83.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		694			928	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	795			1015		
D. Inspection, maintenance or repair without refuelling				183		
E. Testing of plant systems or components				23		
H. Nuclear regulatory requirements				4	1	
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				80	12	0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					1	
Subtotal	795	694	0	1305	949	5
Total		1489			2259	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		48
13. Reactor Auxiliary Systems		8
14. Safety Systems		9
15. Reactor Cooling Systems	275	59
16. Steam generation systems		77
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		58
32. Feedwater and Main Steam System		319
35. All other I&C Systems		2
41. Main Generator Systems	29	45
42. Electrical Power Supply Systems	390	216
XX. Miscellaneous Systems		0
Total	694	845

US-286 INDIAN POINT-3

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 1040.0 MW(e)
Design Net Capacity: 965.0 MW(e)
Design Discharge Burnup: 14000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8994.7 GW(e).h
Energy Availability Factor: 99.0%
Load Factor: 98.7%
Operating Factor: 99.0%
Energy Unavailability Factor: 1.0%
Total Off-line Time: 84 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	779.2	703.5	778.7	754.2	778.3	748.1	766.9	768.0	609.0	776.7	754.1	778.0	8994.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.4	100.0	100.0	100.0	99.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.4	100.0	100.0	100.0	99.0
LF (%)	100.7	100.7	100.8	100.7	100.6	99.9	99.1	99.3	81.3	100.4	100.6	100.5	98.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.3	100.0	100.0	100.0	99.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	1.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jan 1968
Date of First Criticality: 04 Jun 1976
Date of Grid Connection: 27/04/1976
Date of Commercial Operation: 30/08/1976
Lifetime Generation: 195992.7 GW(e).h
Cumulative Energy Availability Factor: 69.7%
Cumulative Load Factor: 66.9%
Cumulative Unit Capability Factor: 69.7%
Cumulative Energy Unavailability Factor: 30.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	2257.5	899	100.0	100.0	100.0	100.0	70.4	70.4	2871	78.2
1977	5520.8	873	72.1	80.3	72.1	80.3	72.2	71.7	6556	74.8
1978	5457.6	911	68.3	75.3	68.3	75.3	68.4	70.3	6365	72.7
1979	4794.6	965	56.7	69.5	56.7	69.5	56.7	66.1	5824	66.5
1980	3070.4	965	53.6	65.7	53.6	65.7	36.2	59.0	4667	53.1
1981	3033.4	965	59.4	64.5	59.4	64.5	35.9	54.6	5236	59.8
1982	1436.1	891	22.5	58.2	22.5	58.2	18.4	49.2	1967	22.5
1983	60.7	934	2.4	50.6	2.4	50.6	0.7	42.6	229	2.6
1984	6041.7	965	76.2	53.8	76.2	53.8	71.3	46.1	6703	76.3
1985	4728.5	965	65.5	55.1	65.5	55.1	55.9	47.2	5782	66.0
1986	5525.6	959	72.9	56.8	72.9	56.8	65.8	49.0	6431	73.4
1987	4850.6	950	60.5	57.2	60.5	57.2	58.3	49.8	5396	61.6
1988	6711.9	965	81.9	59.2	81.9	59.2	79.2	52.3	7217	82.2
1989	4968.7	965	59.7	59.2	59.7	59.2	58.8	52.8	5279	60.3
1990	5031.8	965	60.8	59.4	60.8	59.4	59.5	53.2	5374	61.3
1991	7300.8	965	88.8	61.3	88.8	61.3	86.4	55.4	7577	86.5
1992	4760.6	965	59.2	61.2	59.2	61.2	56.2	55.5	5248	59.7
1993	1192.6	965	13.4	58.4	13.4	58.4	14.1	53.1	1292	14.7
1994	0.0	965	0.0	55.2	0.0	55.2	0.0	50.1	0	0.0
1995	1471.5	965	18.2	53.2	18.2	53.2	17.4	48.4	1696	19.4
1996	5872.5	965	72.4	54.2	72.4	54.2	69.3	49.5	6390	72.7
1997	4337.3	965	57.4	54.3	57.4	54.3	51.3	49.5	4650	53.1
1998	7656.5	965	93.6	56.1	93.6	56.1	90.6	51.4	8197	93.6
1999	7269.2	965	87.4	57.5	87.4	57.5	86.0	52.9	7659	87.4
2000	8432.2	965	97.9	59.1	97.9	59.1	99.5	54.8	8600	97.9
2001	7940.2	965	92.8	60.5	92.8	60.5	93.9	56.4	8130	92.8
2002	8432.6	979	98.3	61.9	98.3	61.9	99.6	58.1	8611	98.3
2003	7608.4	979	88.4	62.9	88.4	62.9	88.7	59.2	7748	88.4
2004	8747.3	979	100.0	64.3	100.0	64.3	101.7	60.7	8784	100.0
2005	8037.2	985	91.0	65.2	91.0	65.2	93.1	61.9	7969	91.0
2006	8974.5	1025	99.4	66.4	99.4	66.4	100.0	63.2	8705	99.4
2007	7797.3	1025	86.8	67.1	86.8	67.1	86.8	64.0	7602	86.8
2008	9162.7	1025	100.0	68.2	100.0	68.2	101.8	65.3	8784	100.0
2009	7703.7	1040	87.5	68.8	87.5	68.8	84.6	65.9	7649	87.3
2010	8994.7	1040	99.0	69.7	99.0	69.7	98.7	66.9	8676	99.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		83			1237	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling				1072		
D. Inspection, maintenance or repair without refuelling				247	1	
E. Testing of plant systems or components				2	10	
J. Grid limitation, failure or grid unavailability					5	0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					12	
P. Fire					0	
Subtotal	0	83	0	1321	1269	0
Total		83			2590	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1976 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		18
13. Reactor Auxiliary Systems		9
14. Safety Systems		585
15. Reactor Cooling Systems		35
16. Steam generation systems		71
17. Safety I&C Systems (excluding reactor I&C)		0
31. Turbine and auxiliaries		101
32. Feedwater and Main Steam System		54
33. Circulating Water System		0
41. Main Generator Systems	83	301
42. Electrical Power Supply Systems		33
XX. Miscellaneous Systems		3
Total	83	1210

US-305 KEWAUNEE

Operator: DOMINION (DOMINION GENERATION)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 556.0 MW(e)
 Design Net Capacity: 535.0 MW(e)
 Design Discharge Burnup: 38900 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4990.3 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 102.5%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	424.2	385.5	425.8	410.9	424.8	409.7	418.6	419.4	411.0	424.3	410.7	425.5	4990.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	102.5	103.2	103.1	102.6	102.7	102.4	101.2	101.4	102.7	102.6	102.4	102.9	102.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jun 1968
 Date of First Criticality: 03 Jul 1974
 Date of Grid Connection: 04 Aug 1974
 Date of Commercial Operation: 16/06/1974

Lifetime Generation: 139239.5 GW(e).h
 Cumulative Energy Availability Factor: 83.6%
 Cumulative Load Factor: 83.3%
 Cumulative Unit Capability Factor: 83.6%
 Cumulative Energy Unavailability Factor: 16.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1719.7	531	76.4	76.4	76.4	76.4	62.6	62.6	3918	76.3
1975	3340.1	535	71.3	73.2	71.3	73.2	71.3	68.1	7730	88.2
1976	3382.5	522	73.7	73.4	73.7	73.4	73.8	70.2	6924	78.8
1977	3546.6	522	77.4	74.5	77.4	74.5	77.6	72.3	6985	79.7
1978	3890.6	519	85.6	76.9	85.6	76.9	85.6	75.1	7835	89.4
1979	3439.2	520	75.5	76.6	75.5	76.6	75.5	75.2	6921	79.0
1980	3631.2	522	82.3	77.5	82.3	77.5	79.2	75.8	7207	82.0
1981	3769.2	516	86.6	78.7	86.6	78.7	83.4	76.8	7596	86.7
1982	3824.9	514	87.4	79.7	87.4	79.7	84.9	77.7	7669	87.5
1983	3706.9	510	83.7	80.1	83.7	80.1	83.0	78.3	7334	83.7
1984	3810.0	503	85.3	80.6	85.3	80.6	86.2	79.0	7527	85.7
1985	3699.2	503	81.8	80.7	81.8	80.7	84.0	79.4	7213	82.3
1986	3854.7	503	85.3	81.0	85.3	81.0	87.5	80.0	7514	85.8
1987	4008.6	503	88.8	81.6	88.8	81.6	91.0	80.8	7809	89.1
1988	3914.8	503	87.1	82.0	87.1	82.0	88.6	81.3	7679	87.4
1989	3741.8	503	83.9	82.1	83.9	82.1	84.9	81.6	7390	84.4
1990	3900.8	503	87.2	82.4	87.2	82.4	88.5	82.0	7668	87.5
1991	3674.8	507	80.3	82.3	80.3	82.3	82.7	82.0	7247	82.7
1992	3938.1	511	87.3	82.5	87.3	82.5	87.7	82.3	7682	87.5
1993	3816.9	511	86.0	82.7	86.0	82.7	85.3	82.5	7548	86.2
1994	3961.5	511	88.2	83.0	88.2	83.0	88.5	82.8	7738	88.3
1995	3793.4	511	87.1	83.2	87.1	83.2	84.7	82.9	7645	87.3
1996	3171.1	511	71.3	82.6	71.3	82.6	70.6	82.3	6299	71.7
1997	2363.8	511	55.5	81.5	55.5	81.5	52.8	81.1	4866	55.5
1998	3705.4	511	86.6	81.7	86.6	81.7	82.8	81.1	7584	86.6
1999	4424.7	511	100.0	82.4	100.0	82.4	98.8	81.8	8760	100.0
2000	3799.9	511	88.5	82.6	88.5	82.6	84.7	81.9	7760	88.3
2001	3461.7	511	80.1	82.5	80.1	82.5	77.3	81.8	7009	80.0
2002	4468.7	511	97.3	83.1	97.3	83.1	99.8	82.4	8514	97.2
2003	4159.1	526	90.5	83.3	90.5	83.3	91.6	82.7	7893	90.1
2004	3873.9	556	80.4	83.2	80.4	83.2	80.4	82.6	7049	80.2
2005	3043.1	539	62.3	82.5	62.3	82.5	64.4	82.0	5451	62.2
2006	3673.8	556	76.0	82.3	76.0	82.3	75.4	81.8	6653	75.9
2007	4625.8	556	94.1	82.7	94.1	82.7	95.0	82.2	8238	94.0
2008	4387.3	556	88.6	82.9	88.6	82.9	89.8	82.5	7782	88.6
2009	4515.3	556	91.7	83.1	91.7	83.1	92.7	82.8	8027	91.6
2010	4990.3	556	100.0	83.6	100.0	83.6	102.5	83.3	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					230	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling				1023		
D. Inspection, maintenance or repair without refuelling				64		
E. Testing of plant systems or components				2		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				2		
H. Nuclear regulatory requirements					1	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	1
L. Human factor related					2	
Subtotal	0	0	0	1091	236	1
Total		0			1328	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		11
12. Reactor I&C Systems		7
14. Safety Systems		96
15. Reactor Cooling Systems		13
16. Steam generation systems		3
31. Turbine and auxiliaries		25
32. Feedwater and Main Steam System		24
33. Circulating Water System		6
35. All other I&C Systems		1
41. Main Generator Systems		3
42. Electrical Power Supply Systems		16
XX. Miscellaneous Systems		18
Total	0	223

US-373 LASALLE-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1118.0 MW(e)
 Design Net Capacity: 1078.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9207.0 GW(e).h
 Energy Availability Factor: 92.7%
 Load Factor: 94.0%
 Operating Factor: 92.7%
 Energy Unavailability Factor: 7.3%
 Total Off-line Time: 641 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	824.1	182.9	670.3	827.4	846.7	808.1	826.0	820.5	815.5	866.7	846.3	872.6	9207.0
EAF (%)	100.0	25.0	81.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.7
UCF (%)	100.0	25.0	81.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.7
LF (%)	99.1	24.3	80.7	102.8	101.8	100.4	99.3	98.6	101.3	104.2	105.0	104.9	94.0
OF (%)	100.0	25.0	81.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	92.7
EUf (%)	0.0	75.0	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
PUf (%)	0.0	75.0	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Oct 1973
 Date of First Criticality: 21/06/1982
 Date of Grid Connection: 09 Apr 1982
 Date of Commercial Operation: 01 Jan 1984

Lifetime Generation: 190642.8 GW(e).h
 Cumulative Energy Availability Factor: 76.7%
 Cumulative Load Factor: 74.5%
 Cumulative Unit Capability Factor: 76.7%
 Cumulative Energy Unavailability Factor: 23.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	5206.2	1078	69.4	69.4	69.4	69.4	55.0	55.0	6052	68.9
1985	4827.5	1036	64.3	66.9	63.7	66.6	53.2	54.1	5581	63.7
1986	2100.8	1036	25.8	53.4	25.8	53.2	23.1	43.9	2331	26.6
1987	4108.1	1036	61.9	55.5	61.9	55.3	45.3	44.3	5455	62.3
1988	5453.7	1036	65.9	57.6	65.9	57.4	59.9	47.4	5818	66.2
1989	6180.6	1036	69.7	59.6	69.7	59.5	68.1	50.8	6103	69.7
1990	8637.4	1036	95.0	64.6	95.0	64.5	95.2	57.1	8329	95.1
1991	6841.4	1036	75.4	65.9	75.4	65.9	75.4	59.4	6627	75.7
1992	6469.3	1036	74.0	66.8	74.0	66.8	71.1	60.7	6528	74.3
1993	7207.5	1036	81.0	68.2	81.0	68.2	79.4	62.5	7102	81.1
1994	4945.3	1036	57.8	67.3	57.8	67.2	54.5	61.8	5095	58.2
1995	8239.6	1036	93.9	69.5	93.9	69.5	90.8	64.2	8226	93.9
1996	3300.4	1036	37.5	67.0	37.5	67.0	36.3	62.1	3349	38.1
1997	0.0	1036	0.0	62.3	0.0	62.2	0.0	57.7	0	0.0
1998	3336.7	1036	36.3	60.5	36.3	60.5	36.8	56.3	3174	36.2
1999	8013.7	1036	90.8	62.4	90.8	62.4	88.3	58.3	7963	90.9
2000	9745.4	1078	100.0	64.7	100.0	64.7	102.8	61.0	8784	100.0
2001	9850.4	1111	99.4	66.8	99.4	66.7	101.0	63.3	8708	99.4
2002	8927.6	1111	90.6	68.1	90.6	68.1	91.7	64.9	7945	90.7
2003	9739.0	1111	99.5	69.8	99.5	69.7	100.1	66.8	8716	99.5
2004	9051.5	1111	91.5	70.9	91.5	70.8	92.8	68.1	8059	91.7
2005	9812.0	1146	100.0	72.3	100.0	72.3	97.7	69.5	8760	100.0
2006	9092.1	1118	92.8	73.2	92.8	73.2	92.8	70.6	8129	92.8
2007	9664.6	1118	100.0	74.4	100.0	74.4	98.7	71.8	8760	100.0
2008	8883.8	1118	92.3	75.1	92.3	75.1	90.5	72.6	8103	92.2
2009	9700.7	1118	98.0	76.1	98.0	76.0	99.1	73.7	8580	97.9
2010	9207.0	1118	92.7	76.7	92.7	76.7	94.0	74.5	8119	92.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					425	
B. Refuelling without a maintenance					34	
C. Inspection, maintenance or repair combined with refuelling	640			1000		
D. Inspection, maintenance or repair without refuelling				406		
E. Testing of plant systems or components				58	0	
H. Nuclear regulatory requirements					191	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					15	
Subtotal	640	0	0	1464	665	1
Total		640			2130	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		32
12. Reactor I&C Systems		23
13. Reactor Auxiliary Systems		4
14. Safety Systems		42
15. Reactor Cooling Systems		121
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		103
32. Feedwater and Main Steam System		17
33. Circulating Water System		8
35. All other I&C Systems		4
41. Main Generator Systems		13
42. Electrical Power Supply Systems		35
Total	0	403

US-374 LASALLE-2

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1120.0 MW(e)
 Design Net Capacity: 1078.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9925.5 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 101.2%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	859.0	776.5	853.2	825.6	843.8	802.3	819.2	810.1	806.9	845.9	828.1	854.8	9925.5
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	103.1	103.2	102.5	102.4	101.3	99.5	98.3	97.2	100.1	101.5	102.6	102.6	101.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 09 Oct 1973
 Date of First Criticality: 03 Oct 1984
 Date of Grid Connection: 20/04/1984
 Date of Commercial Operation: 19/10/1984
 Lifetime Generation: 185478.5 GW(e).h
 Cumulative Energy Availability Factor: 76.0%
 Cumulative Load Factor: 75.0%
 Cumulative Unit Capability Factor: 76.1%
 Cumulative Energy Unavailability Factor: 24.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	1392.1	1039	86.4	86.4	86.4	86.4	75.7	75.7	1536	86.5
1985	3477.0	1036	41.8	49.3	41.8	49.3	38.3	44.6	3698	42.2
1986	5727.8	1036	75.0	61.0	74.6	60.8	63.1	53.0	6533	74.6
1987	4573.3	1036	53.1	58.5	53.1	58.4	50.4	52.2	4699	53.6
1988	5662.8	1036	75.1	62.5	75.1	62.4	62.2	54.6	6593	75.1
1989	6506.8	1036	75.1	64.9	75.1	64.8	71.7	57.9	6591	75.2
1990	6216.8	1036	70.0	65.7	70.0	65.7	68.5	59.6	6162	70.3
1991	8712.4	1036	95.3	69.8	95.3	69.8	96.0	64.6	8357	95.4
1992	5797.9	1036	66.3	69.4	66.3	69.4	63.7	64.5	5850	66.6
1993	5859.2	1036	66.1	69.0	66.1	69.0	64.6	64.5	5825	66.5
1994	8428.9	1036	92.4	71.3	92.4	71.3	92.9	67.3	8101	92.5
1995	5905.7	1036	66.5	70.9	66.5	70.9	65.1	67.1	5855	66.8
1996	5642.3	1036	64.5	70.4	64.5	70.3	62.0	66.7	5649	64.3
1997	0.0	1036	0.0	65.1	0.0	65.0	0.0	61.6	0	0.0
1998	0.0	1036	0.0	60.5	0.0	60.4	0.0	57.3	0	0.0
1999	6632.3	1036	71.1	61.2	71.1	61.1	73.1	58.3	6231	71.1
2000	9040.4	1072	93.1	63.2	93.1	63.2	96.0	60.7	8229	93.7
2001	9683.4	1111	97.2	65.3	97.2	65.3	99.3	63.1	8515	97.2
2002	8995.6	1111	92.1	66.9	92.1	66.9	92.4	64.8	8078	92.2
2003	8709.1	1111	88.4	68.1	88.4	68.0	89.5	66.2	7762	88.6
2004	9940.4	1111	99.8	69.7	99.8	69.7	101.9	68.1	8764	99.8
2005	8901.2	1147	89.7	70.7	89.7	70.7	88.6	69.1	7857	89.7
2006	10015.7	1120	100.0	72.1	100.0	72.1	102.1	70.7	8760	100.0
2007	9315.5	1120	94.6	73.2	94.6	73.1	94.9	71.8	8287	94.6
2008	9964.6	1120	100.0	74.3	100.0	74.3	101.3	73.1	8784	100.0
2009	9108.0	1120	92.0	75.1	92.0	75.0	92.8	73.9	8058	92.0
2010	9925.5	1120	100.0	76.1	100.0	76.0	101.2	75.0	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					262	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling				1152		
D. Inspection, maintenance or repair without refuelling				172		
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements					413	
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				44	20	
Subtotal	0	0	0	1369	702	1
Total		0			2072	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1984 to 2010 Average Hours Lost Per Year	
		Planned	Unplanned
11. Reactor and Accessories			62
12. Reactor I&C Systems			61
15. Reactor Cooling Systems			16
31. Turbine and auxiliaries			31
32. Feedwater and Main Steam System			7
35. All other I&C Systems			11
41. Main Generator Systems			0
42. Electrical Power Supply Systems			23
XX. Miscellaneous Systems			15
Total	0		226

US-352 LIMERICK-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1130.0 MW(e)
 Design Net Capacity: 1055.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9046.9 GW(e).h
 Energy Availability Factor: 92.8%
 Load Factor: 91.4%
 Operating Factor: 92.8%
 Energy Unavailability Factor: 7.2%
 Total Off-line Time: 631 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	848.9	754.7	522.5	441.5	839.1	655.3	816.5	828.9	796.8	848.9	830.7	863.2	9046.9
EAF (%)	100.0	100.0	67.7	57.5	100.0	88.4	100.0	100.0	100.0	100.0	100.0	100.0	92.8
UCF (%)	100.0	100.0	67.7	57.5	100.0	88.4	100.0	100.0	100.0	100.0	100.0	100.0	92.8
LF (%)	101.0	99.4	62.2	54.3	99.8	80.5	97.1	98.6	97.9	101.0	102.0	102.7	91.4
OF (%)	100.0	100.0	67.7	57.4	100.0	88.3	100.0	100.0	100.0	100.0	100.0	100.0	92.8
EUf (%)	0.0	0.0	32.3	42.5	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	7.2
PUf (%)	0.0	0.0	32.3	42.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/06/1974
 Date of First Criticality: 22/12/1984
 Date of Grid Connection: 13/04/1985
 Date of Commercial Operation: 02 Jan 1986

Lifetime Generation: 210626.3 GW(e).h
 Cumulative Energy Availability Factor: 90.1%
 Cumulative Load Factor: 87.1%
 Cumulative Unit Capability Factor: 90.1%
 Cumulative Energy Unavailability Factor: 9.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	6848.9	1055	82.8	82.8	82.8	82.8	81.0	81.0	6634	82.8
1987	5341.3	1055	67.7	74.9	67.7	74.9	57.8	68.9	5924	67.6
1988	6674.8	1055	96.4	82.3	96.4	82.3	72.0	70.0	8470	96.4
1989	5244.3	1055	69.4	79.0	69.4	79.0	56.7	66.6	5638	64.4
1990	5633.1	1055	65.3	76.2	65.3	76.2	61.0	65.4	5724	65.3
1991	8133.8	1055	91.8	78.9	91.8	78.9	88.0	69.3	8043	91.8
1992	6239.6	1055	69.6	77.5	69.6	77.5	67.3	69.0	6115	69.6
1993	8745.5	1055	98.5	80.2	98.5	80.2	94.6	72.2	8626	98.5
1994	7858.0	1055	89.5	81.2	89.5	81.2	85.0	73.7	7840	89.5
1995	8147.5	1055	91.1	82.2	91.1	82.2	88.2	75.1	7973	91.0
1996	8141.6	1096	88.8	82.8	88.8	82.8	84.5	76.0	7758	88.3
1997	9227.5	1105	97.5	84.1	97.5	84.1	95.3	77.7	8534	97.4
1998	7449.1	1112	81.6	83.9	81.6	83.9	76.4	77.6	7061	80.6
1999	9744.0	1134	98.0	85.0	98.0	85.0	98.1	79.1	8588	98.0
2000	8988.1	1139	90.9	85.4	90.9	85.4	89.8	79.9	7982	90.9
2001	10133.1	1143	99.7	86.4	99.7	86.4	101.2	81.3	8735	99.7
2002	9286.8	1134	94.1	86.8	94.1	86.8	93.5	82.1	8244	94.1
2003	10057.5	1134	99.0	87.5	99.0	87.5	101.2	83.2	8672	99.0
2004	9539.1	1134	95.0	88.0	95.0	88.0	95.8	83.9	8345	95.0
2005	9926.9	1134	98.7	88.5	98.7	88.5	99.9	84.7	8642	98.6
2006	9320.4	1134	93.9	88.8	93.9	88.8	93.8	85.2	8224	93.9
2007	9994.4	1134	99.8	89.3	99.8	89.3	100.6	85.9	8744	99.8
2008	9342.5	1134	93.9	89.5	93.9	89.5	93.8	86.3	8251	93.9
2009	10019.4	1130	100.0	90.0	100.0	90.0	101.2	86.9	8760	100.0
2010	9046.9	1130	92.8	90.1	92.8	90.1	91.4	87.1	8129	92.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		83			149	
C. Inspection, maintenance or repair combined with refuelling	546			656		
D. Inspection, maintenance or repair without refuelling				126	0	
E. Testing of plant systems or components				21	2	
H. Nuclear regulatory requirements				95		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				100	34	
Subtotal	546	83	0	998	185	0
Total		629			1183	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
13. Reactor Auxiliary Systems		8
14. Safety Systems		12
15. Reactor Cooling Systems		32
21. Fuel Handling and Storage Facilities		7
31. Turbine and auxiliaries		43
32. Feedwater and Main Steam System		10
41. Main Generator Systems		3
42. Electrical Power Supply Systems	83	16
XX. Miscellaneous Systems		11
Total	83	146

US-353 LIMERICK-2

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1134.0 MW(e)
 Design Net Capacity: 1055.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9879.1 GW(e).h
 Energy Availability Factor: 99.6%
 Load Factor: 99.4%
 Operating Factor: 99.6%
 Energy Unavailability Factor: 0.4%
 Total Off-line Time: 33 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	868.6	786.3	807.1	826.9	841.6	804.8	818.6	830.4	787.8	825.1	836.0	845.9	9879.1
EAF (%)	100.0	100.0	95.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6
UCF (%)	100.0	100.0	95.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6
LF (%)	103.0	103.2	95.8	101.3	99.8	98.6	97.0	98.4	96.5	97.8	102.2	100.3	99.4
OF (%)	100.0	100.0	95.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.6
EUf (%)	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/06/1974
 Date of First Criticality: 08 Dec 1989
 Date of Grid Connection: 09 Jan 1989
 Date of Commercial Operation: 01 Aug 1990
 Lifetime Generation: 188093.5 GW(e).h
 Cumulative Energy Availability Factor: 93.3%
 Cumulative Load Factor: 91.9%
 Cumulative Unit Capability Factor: 93.3%
 Cumulative Energy Unavailability Factor: 6.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	7232.6	1055	81.8	81.8	81.8	81.8	79.8	79.8	7174	83.5
1991	7146.9	1055	77.8	79.8	77.8	79.8	77.3	78.5	6919	79.0
1992	8489.2	1055	97.4	85.7	97.4	85.7	91.6	82.9	8557	97.4
1993	7468.7	1055	82.3	84.9	82.3	84.9	80.8	82.4	7289	83.2
1994	8571.5	1055	98.8	87.6	98.8	87.6	92.7	84.5	8657	98.8
1995	8401.4	1110	91.2	88.3	91.2	88.3	86.4	84.8	7984	91.1
1996	9001.1	1115	95.7	89.4	95.1	89.3	91.9	85.9	8346	95.0
1997	8307.5	1115	89.3	89.4	89.3	89.3	85.1	85.8	7840	89.5
1998	9257.9	1115	95.3	90.0	95.3	90.0	94.8	86.8	8346	95.3
1999	8561.0	1135	88.4	89.9	88.4	89.8	86.1	86.7	7726	88.2
2000	9940.7	1145	98.6	90.7	98.6	90.7	98.8	87.9	8661	98.6
2001	9243.4	1143	93.9	91.0	93.9	90.9	92.3	88.3	8230	93.9
2002	10009.5	1134	99.0	91.6	99.0	91.6	100.8	89.3	8672	99.0
2003	9387.1	1134	94.2	91.8	94.2	91.8	94.5	89.6	8252	94.2
2004	9952.0	1134	99.4	92.3	99.4	92.3	99.9	90.3	8734	99.4
2005	9124.7	1134	92.3	92.3	92.3	92.3	91.9	90.4	8085	92.3
2006	10015.1	1134	99.4	92.8	99.4	92.7	100.8	91.1	8710	99.4
2007	9059.2	1134	91.4	92.7	91.4	92.7	91.2	91.1	8007	91.4
2008	9712.1	1134	97.0	92.9	97.0	92.9	97.5	91.4	8517	97.0
2009	9311.4	1134	94.1	93.0	94.1	93.0	93.7	91.5	8241	94.1
2010	9879.1	1134	99.6	93.3	99.6	93.3	99.4	91.9	8727	99.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		32			124	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling				366		
D. Inspection, maintenance or repair without refuelling				67		
E. Testing of plant systems or components				0		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Subtotal	0	32	0	433	144	2
Total		32			579	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1990 to 2010 Average Hours Lost Per Year
13. Reactor Auxiliary Systems		3
15. Reactor Cooling Systems		9
17. Safety I&C Systems (excluding reactor I&C)		4
31. Turbine and auxiliaries	32	57
32. Feedwater and Main Steam System		8
35. All other I&C Systems		8
41. Main Generator Systems		10
42. Electrical Power Supply Systems		15
Total	32	114

US-369 MCGUIRE-1

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1100.0 MW(e)
 Design Net Capacity: 1180.0 MW(e)
 Design Discharge Burnup: 40200 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8835.7 GW(e).h
 Energy Availability Factor: 88.8%
 Load Factor: 91.7%
 Operating Factor: 88.8%
 Energy Unavailability Factor: 11.2%
 Total Off-line Time: 982 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	849.8	774.7	330.9	260.6	855.7	690.4	845.2	847.3	819.2	860.0	836.7	865.2	8835.7
EAF (%)	100.0	100.0	38.6	38.2	100.0	89.0	100.0	100.0	100.0	100.0	100.0	100.0	88.8
UCF (%)	100.0	100.0	38.6	38.2	100.0	89.0	100.0	100.0	100.0	100.0	100.0	100.0	88.8
LF (%)	103.8	104.8	40.5	32.9	104.6	87.2	103.3	103.5	103.4	105.1	105.5	105.7	91.7
OF (%)	100.0	100.0	39.7	36.9	100.0	88.9	100.0	100.0	100.0	100.0	100.0	100.0	88.8
EUf (%)	0.0	0.0	61.4	61.8	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	11.2
PUF (%)	0.0	0.0	61.4	61.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 04 Jan 1971
 Date of First Criticality: 08 Aug 1981
 Date of Grid Connection: 09 Dec 1981
 Date of Commercial Operation: 12 Jan 1981
 Lifetime Generation: 223007.9 GW(e).h
 Cumulative Energy Availability Factor: 80.7%
 Cumulative Load Factor: 77.7%
 Cumulative Unit Capability Factor: 81.0%
 Cumulative Energy Unavailability Factor: 19.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	19.1	1146	10.2	10.2	10.2	10.2	2.2	2.2	45	6.0
1982	4302.3	1180	81.6	76.0	81.6	76.0	41.6	38.5	7043	80.4
1983	4650.0	1180	57.3	67.0	57.3	67.0	45.0	41.6	4852	55.4
1984	6434.3	1180	78.1	70.6	69.3	67.8	62.1	48.3	6011	68.4
1985	6780.1	1180	77.1	72.2	77.1	70.1	65.6	52.5	6747	77.0
1986	5181.1	1150	56.2	69.1	56.2	67.4	51.4	52.3	4912	56.1
1987	7352.9	1150	76.7	70.3	76.7	68.9	73.0	55.6	6713	76.6
1988	7406.4	1129	77.0	71.3	77.0	70.0	74.7	58.3	6763	77.0
1989	7807.2	1129	84.5	72.9	84.5	71.7	78.9	60.7	7187	82.0
1990	4755.3	1129	56.9	71.1	56.9	70.2	48.1	59.4	4718	53.9
1991	6851.1	1129	71.4	71.2	71.4	70.3	69.3	60.3	6259	71.4
1992	7485.3	1129	77.9	71.8	77.9	71.0	75.5	61.7	6839	77.9
1993	5537.1	1129	58.2	70.7	58.2	69.9	56.0	61.2	5095	58.2
1994	6877.3	1129	71.9	70.8	71.9	70.1	69.5	61.8	6291	71.8
1995	8860.2	1129	91.6	72.2	91.6	71.6	89.6	63.8	8017	91.5
1996	8558.3	1129	89.5	73.3	89.5	72.7	86.3	65.3	7858	89.5
1997	7011.3	1129	72.7	73.3	72.7	72.7	70.9	65.6	6361	72.6
1998	8822.6	1119	90.0	74.3	90.0	73.7	90.0	67.0	7889	90.1
1999	8593.3	1100	86.6	74.9	86.6	74.4	89.2	68.2	7584	86.6
2000	9995.0	1100	99.5	76.2	99.5	75.7	103.4	70.0	8741	99.5
2001	8684.9	1100	88.0	76.7	88.0	76.3	90.1	70.9	7708	88.0
2002	9100.8	1100	91.8	77.4	91.8	77.0	94.4	72.0	8042	91.8
2003	9912.5	1100	100.0	78.4	100.0	78.0	102.9	73.4	8760	100.0
2004	8238.5	1100	83.4	78.6	83.4	78.2	85.3	73.9	7321	83.3
2005	8968.6	1100	90.9	79.1	90.9	78.7	93.1	74.7	7963	90.9
2006	9967.2	1100	100.0	79.9	100.0	79.6	103.4	75.8	8760	100.0
2007	7656.1	1100	78.2	79.9	78.2	79.5	79.5	75.9	6852	78.2
2008	8364.4	1100	84.4	80.0	84.4	79.7	86.6	76.3	7412	84.4
2009	9999.1	1100	100.0	80.7	100.0	80.4	103.8	77.2	8760	100.0
2010	8835.7	1100	88.8	81.0	88.8	80.7	91.7	77.7	7778	88.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010		
	Planned	Unplanned	External	Average Hours Lost Per Year		
				Planned	Unplanned	External
A. Plant equipment problem/failure		79			470	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling	901			883		
D. Inspection, maintenance or repair without refuelling				136	35	
E. Testing of plant systems or components				18		
H. Nuclear regulatory requirements					8	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				14	4	25
Subtotal	901	79	0	1051	520	25
Total		980			1596	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		6
12. Reactor I&C Systems	79	15
13. Reactor Auxiliary Systems		21
14. Safety Systems		26
15. Reactor Cooling Systems		74
16. Steam generation systems		78
17. Safety I&C Systems (excluding reactor I&C)		1
21. Fuel Handling and Storage Facilities		31
31. Turbine and auxiliaries		51
32. Feedwater and Main Steam System		118
41. Main Generator Systems		5
42. Electrical Power Supply Systems		13
XX. Miscellaneous Systems		25
Total	79	464

US-370 MCGUIRE-2

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1100.0 MW(e)
 Design Net Capacity: 1180.0 MW(e)
 Design Discharge Burnup: 40600 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10014.7 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 103.9%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	854.9	780.0	861.1	828.8	848.9	809.1	837.7	834.7	811.5	853.5	832.0	862.5	10014.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	104.5	105.5	105.4	104.6	103.7	102.2	102.4	102.0	102.5	104.3	104.9	105.4	103.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 04 Jan 1971
 Date of First Criticality: 05 Aug 1983
 Date of Grid Connection: 23/05/1983
 Date of Commercial Operation: 03 Jan 1984

Lifetime Generation: 222197.0 GW(e).h
 Cumulative Energy Availability Factor: 84.8%
 Cumulative Load Factor: 84.3%
 Cumulative Unit Capability Factor: 84.8%
 Cumulative Energy Unavailability Factor: 15.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	6557.8	1171	83.0	83.0	83.0	83.0	75.7	75.7	6086	82.9
1985	5609.3	1180	61.0	71.0	61.0	71.0	54.3	64.0	5171	59.0
1986	6216.6	1150	64.5	68.8	64.5	68.8	61.7	63.2	5601	63.9
1987	7577.4	1150	80.2	71.7	80.2	71.7	75.2	66.3	6954	79.4
1988	8058.0	1129	82.3	73.9	82.3	73.9	81.3	69.3	7229	82.3
1989	7418.3	1129	78.4	74.6	78.4	74.6	75.0	70.3	6867	78.4
1990	6496.2	1129	69.5	73.9	69.5	73.9	65.7	69.6	5873	67.0
1991	9516.0	1129	97.6	76.9	97.6	76.9	96.2	73.0	8548	97.6
1992	6785.0	1129	70.0	76.1	70.0	76.1	68.4	72.5	6141	69.9
1993	6821.1	1129	72.8	75.8	72.8	75.8	69.0	72.1	6378	72.8
1994	8660.0	1129	88.0	76.9	88.0	76.9	87.6	73.5	7708	88.0
1995	9090.0	1129	93.0	78.2	93.0	78.2	91.9	75.1	8144	93.0
1996	7265.1	1129	74.6	77.9	74.6	77.9	73.3	74.9	6543	74.5
1997	6648.4	1129	71.0	77.4	71.0	77.4	67.2	74.4	6214	70.9
1998	9928.3	1119	99.5	78.9	99.5	78.9	101.3	76.1	8715	99.5
1999	8596.7	1100	90.5	79.6	90.5	79.6	89.2	76.9	7927	90.5
2000	8452.4	1100	88.3	80.1	88.3	80.1	87.5	77.6	7757	88.3
2001	9878.0	1100	99.3	81.2	99.3	81.2	102.5	78.9	8698	99.3
2002	8913.5	1100	90.7	81.7	90.7	81.7	92.5	79.6	7940	90.6
2003	9027.8	1100	91.6	82.1	91.6	82.1	93.7	80.3	8024	91.6
2004	9994.0	1100	100.0	83.0	100.0	83.0	103.4	81.4	8784	100.0
2005	8545.6	1100	86.7	83.1	86.7	83.1	88.7	81.7	7589	86.6
2006	8430.3	1100	84.7	83.2	84.7	83.2	87.5	82.0	7418	84.7
2007	9967.6	1100	100.0	83.9	100.0	83.9	103.4	82.8	8760	100.0
2008	8713.3	1100	87.1	84.0	87.1	84.0	90.2	83.1	7651	87.1
2009	9015.7	1100	90.3	84.3	90.3	84.3	93.6	83.5	7907	90.3
2010	10014.7	1100	100.0	84.8	100.0	84.8	103.9	84.3	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010		
	Planned	Unplanned	External	Average Hours Lost Per Year		
				Planned	Unplanned	External
A. Plant equipment problem/failure				1	251	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling				949		
D. Inspection, maintenance or repair without refuelling				94	0	
E. Testing of plant systems or components				0	0	
H. Nuclear regulatory requirements					10	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	4	
Subtotal	0	0	0	1044	268	0
Total		0			1312	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		2
12. Reactor I&C Systems		19
13. Reactor Auxiliary Systems		20
14. Safety Systems		17
15. Reactor Cooling Systems		70
16. Steam generation systems		14
17. Safety I&C Systems (excluding reactor I&C)		2
21. Fuel Handling and Storage Facilities		1
31. Turbine and auxiliaries		7
32. Feedwater and Main Steam System		42
41. Main Generator Systems		27
42. Electrical Power Supply Systems		7
XX. Miscellaneous Systems		1
Total	0	229

US-336 MILLSTONE-2

Operator: DOMINION (DOMINION GENERATION)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 869.0 MW(e)
 Design Net Capacity: 870.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7414.6 GW(e).h
 Energy Availability Factor: 97.6%
 Load Factor: 97.4%
 Operating Factor: 97.6%
 Energy Unavailability Factor: 2.4%
 Total Off-line Time: 213 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	653.5	537.2	642.0	632.1	593.5	631.3	650.5	649.1	628.7	650.3	535.4	610.9	7414.6
EAF (%)	100.0	91.3	100.0	100.0	92.3	100.0	100.0	100.0	100.0	100.0	86.3	100.0	97.6
UCF (%)	100.0	100.0	100.0	100.0	92.3	100.0	100.0	100.0	100.0	100.0	86.3	100.0	98.2
LF (%)	101.1	92.0	99.4	101.0	91.8	100.9	100.6	100.4	100.5	100.6	85.4	94.5	97.4
OF (%)	100.0	91.4	100.0	100.0	92.3	100.0	100.0	100.0	100.0	100.0	86.4	100.0	97.6
EUf (%)	0.0	8.7	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	13.7	0.0	2.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.5
UCLF (%)	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	7.7	0.0	1.3
XUF (%)	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jan 1969
 Date of First Criticality: 17/10/1975
 Date of Grid Connection: 11 Sep 1975
 Date of Commercial Operation: 26/12/1975
 Lifetime Generation: 174033.5 GW(e).h
 Cumulative Energy Availability Factor: 67.4%
 Cumulative Load Factor: 65.8%
 Cumulative Unit Capability Factor: 68.1%
 Cumulative Energy Unavailability Factor: 32.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation								
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online		
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]	
1975	115.7	851	100.0	100.0	100.0	100.0	20.9	20.9	20.9	414	55.6
1976	4543.2	780	66.4	68.9	66.4	68.9	66.3	62.9	68.15	6815	77.6
1977	4345.7	790	62.9	66.0	62.9	66.0	62.8	62.9	5756	65.7	
1978	4507.2	802	64.1	65.4	64.1	65.4	64.2	63.3	5756	65.7	
1979	4370.9	837	59.6	63.9	59.6	63.9	59.6	62.3	5385	61.5	
1980	4884.3	864	80.8	67.4	68.2	64.8	64.4	62.8	5947	67.7	
1981	6091.7	864	82.7	70.1	82.7	67.9	80.5	65.8	7229	82.5	
1982	5015.6	864	70.5	70.1	70.5	68.3	66.3	65.9	6183	70.6	
1983	2474.4	861	34.1	65.5	34.1	63.9	32.8	61.7	2993	34.2	
1984	6608.3	860	93.4	68.7	93.4	67.2	87.5	64.6	8209	93.5	
1985	3515.6	841	59.4	67.8	47.7	65.3	47.7	62.9	4322	49.3	
1986	5164.9	857	72.5	68.2	72.5	66.0	68.8	63.5	6352	72.5	
1987	6892.5	857	93.3	70.3	93.3	68.3	91.8	68.3	8177	93.3	
1988	5735.9	860	77.2	70.9	77.2	69.0	75.9	66.6	6810	77.5	
1989	4763.6	863	66.9	70.6	66.9	68.8	63.0	66.4	5705	65.1	
1990	5309.9	863	72.8	70.7	72.8	69.1	70.2	66.6	6389	72.9	
1991	3948.1	863	55.3	69.7	55.3	68.2	52.2	65.7	4820	55.0	
1992	2725.0	870	36.1	67.7	36.1	66.3	35.6	63.9	3187	36.3	
1993	6295.9	873	84.8	68.7	84.8	67.3	82.3	64.9	7431	84.8	
1994	3676.5	873	49.0	67.6	49.0	66.3	48.1	64.0	4289	49.0	
1995	2740.5	873	37.4	66.1	37.4	64.9	35.8	62.6	3273	37.4	
1996	1046.5	871	13.7	63.5	13.7	62.4	13.7	60.2	1222	13.9	
1997	0.0	871	0.0	60.6	0.0	59.5	0.0	57.4	0	0.0	
1998	0.0	871	0.0	57.9	0.0	56.9	0.0	54.9	0	0.0	
1999	4433.2	870	60.6	58.0	60.6	57.0	58.2	55.0	5310	60.6	
2000	6268.5	872	83.7	59.1	83.7	58.1	81.8	56.1	7353	83.7	
2001	7284.0	869	98.0	60.6	98.0	59.7	95.4	57.7	8587	98.0	
2002	6209.3	871	83.2	61.4	83.2	60.6	81.5	58.6	7285	83.2	
2003	6109.8	866	80.9	62.1	80.9	61.3	80.2	59.3	7083	80.9	
2004	7596.0	877	98.8	63.4	98.8	62.6	98.7	60.7	8677	98.8	
2005	6843.0	866	89.2	64.3	89.2	63.5	90.2	61.7	7812	89.2	
2006	6519.5	882	85.1	65.0	85.1	64.2	84.4	62.5	7453	85.1	
2007	7686.8	877	100.0	66.1	100.0	65.4	100.1	63.7	8760	100.0	
2008	6619.6	877	88.2	66.8	86.5	66.0	85.9	64.3	7596	86.5	
2009	6239.2	877	82.2	67.2	82.2	66.5	81.2	64.8	7196	82.1	
2010	7414.6	869	98.2	68.1	97.6	67.4	97.4	65.8	8547	97.6	

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		111			557	
B. Refuelling without a maintenance					26	
C. Inspection, maintenance or repair combined with refuelling				1218		
D. Inspection, maintenance or repair without refuelling	43			45		
E. Testing of plant systems or components				9	203	
H. Nuclear regulatory requirements					573	30
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				23	6	29
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			57			4
Subtotal	43	111	57	1295	1365	63
Total		211			2723	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		43
13. Reactor Auxiliary Systems		12
14. Safety Systems		16
15. Reactor Cooling Systems		116
16. Steam generation systems	56	88
31. Turbine and auxiliaries		80
32. Feedwater and Main Steam System		93
33. Circulating Water System	54	4
35. All other I&C Systems		1
41. Main Generator Systems		2
42. Electrical Power Supply Systems		83
XX. Miscellaneous Systems		0
Total	110	538

US-423 MILLSTONE-3

Operator: DOMINION (DOMINION GENERATION)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1233.0 MW(e)
Design Net Capacity: 1159.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9335.7 GW(e).h
Energy Availability Factor: 88.1%
Load Factor: 86.4%
Operating Factor: 87.0%
Energy Unavailability Factor: 11.9%
Total Off-line Time: 1137 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	749.6	831.2	918.2	286.5	354.5	887.1	911.0	797.0	878.0	915.1	889.6	917.8	9335.7
EAF (%)	84.1	100.0	100.0	35.5	49.6	100.0	100.0	88.1	100.0	100.0	100.0	100.0	88.1
UCF (%)	84.1	100.0	100.0	35.5	49.6	100.0	100.0	88.1	100.0	100.0	100.0	100.0	88.1
LF (%)	81.7	100.3	100.2	32.3	38.6	99.9	99.3	86.9	98.9	99.8	100.1	100.1	86.4
OF (%)	82.7	100.0	100.0	32.9	42.3	100.0	100.0	87.1	100.0	100.0	100.0	100.0	87.0
EUf (%)	15.9	0.0	0.0	64.5	50.4	0.0	0.0	11.9	0.0	0.0	0.0	0.0	11.9
PUf (%)	0.0	0.0	0.0	64.5	50.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6
UCLF (%)	15.9	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	0.0	0.0	2.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Sep 1974
Date of First Criticality: 23/01/1986
Date of Grid Connection: 02 Dec 1986
Date of Commercial Operation: 23/04/1986

Lifetime Generation: 185382.3 GW(e).h
Cumulative Energy Availability Factor: 76.3%
Cumulative Load Factor: 74.6%
Cumulative Unit Capability Factor: 76.3%
Cumulative Energy Unavailability Factor: 23.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986			Data not provided							
1987	6748.2	1142	71.4	71.4	71.4	71.4	67.5	67.5	6235	71.2
1988	7683.6	1142	79.5	75.4	79.5	75.4	76.6	72.0	6954	79.2
1989	7082.6	1142	75.9	75.6	75.9	75.6	70.8	71.6	6636	75.8
1990	8218.2	1137	89.2	79.0	89.2	79.0	82.5	74.3	7798	89.0
1991	2876.7	1137	33.6	69.9	33.6	69.9	28.9	65.3	2850	32.5
1992	6593.8	1137	72.1	70.3	72.1	70.3	66.0	65.4	6311	71.8
1993	6502.8	1137	70.1	70.3	70.1	70.3	65.3	65.4	6106	69.7
1994	9416.2	1137	96.3	73.5	96.3	73.5	94.5	69.0	8426	96.2
1995	7993.6	1137	81.2	74.4	81.2	74.4	80.3	70.3	7083	80.9
1996	2476.7	1137	25.7	69.5	25.7	69.5	24.8	65.7	2156	24.5
1997	0.0	1137	0.0	63.2	0.0	63.2	0.0	59.8	0	0.0
1998	3392.1	1137	38.9	61.2	38.9	61.2	34.1	57.6	3402	38.8
1999	8307.5	1139	83.7	62.9	83.7	62.9	83.2	59.6	7329	83.7
2000	10125.7	1151	100.0	65.6	100.0	65.6	100.1	62.5	8784	100.0
2001	8169.7	1136	84.3	66.8	84.3	66.8	81.3	63.8	7392	84.4
2002	8746.2	1130	89.0	68.2	89.0	68.2	88.1	65.3	7803	89.1
2003	10005.7	1130	99.6	70.0	99.6	70.0	101.1	67.4	8729	99.6
2004	8983.7	1148	90.1	71.2	90.1	71.2	89.9	68.6	7905	90.0
2005	8767.0	1131	88.0	72.0	87.6	72.0	88.5	69.7	7677	87.6
2006	10111.1	1155	100.0	73.5	100.0	73.4	99.9	71.2	8760	100.0
2007	8699.4	1145	87.7	74.1	87.7	74.1	86.7	71.9	7694	87.8
2008	8850.3	1145	88.1	74.8	88.1	74.8	88.0	72.7	7739	88.1
2009	10418.2	1137	96.7	75.7	96.7	75.7	104.6	74.1	8470	96.7
2010	9335.7	1233	88.1	76.3	88.1	76.3	86.4	74.6	7623	87.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		224			548	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling	911			682		
D. Inspection, maintenance or repair without refuelling				64		
E. Testing of plant systems or components				3		
H. Nuclear regulatory requirements					365	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					383	
L. Human factor related					0	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	911	224	0	749	1302	1
Total		1135			2052	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		20
14. Safety Systems		187
15. Reactor Cooling Systems	95	39
17. Safety I&C Systems (excluding reactor I&C)		9
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		19
33. Circulating Water System		5
41. Main Generator Systems	128	22
42. Electrical Power Supply Systems		5
XX. Miscellaneous Systems		159
Total	223	495

US-263 MONTICELLO

Operator: NSP (Northern States Power Co.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 572.0 MW(e)
 Design Net Capacity: 545.0 MW(e)
 Design Discharge Burnup: 27000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4695.1 GW(e).h
 Energy Availability Factor: 97.1%
 Load Factor: 93.7%
 Operating Factor: 97.1%
 Energy Unavailability Factor: 2.9%
 Total Off-line Time: 256 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	433.5	390.9	432.6	414.4	423.9	402.8	413.9	398.6	389.6	402.3	163.5	429.0	4695.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	64.5	100.0	97.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	64.5	100.0	97.1
LF (%)	101.9	101.7	101.8	100.6	99.6	97.8	97.3	93.7	94.6	94.5	39.7	100.8	93.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	64.5	100.0	97.1
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5	0.0	2.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5	0.0	2.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/06/1967
 Date of First Criticality: 12 Oct 1970
 Date of Grid Connection: 03 May 1971
 Date of Commercial Operation: 30/06/1971
 Lifetime Generation: 153739.3 GW(e).h
 Cumulative Energy Availability Factor: 85.0%
 Cumulative Load Factor: 80.4%
 Cumulative Unit Capability Factor: 85.0%
 Cumulative Energy Unavailability Factor: 15.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971	1361.1	564	100.0	100.0	100.0	100.0	46.7	46.7	2850	55.5
1972	3717.9	580	100.0	100.0	100.0	100.0	73.0	63.4	6975	79.4
1973	3271.6	580	100.0	100.0	100.0	100.0	64.4	63.8	6242	71.3
1974	2925.2	538	75.0	93.4	75.0	93.4	62.1	63.3	6567	75.0
1975	2881.4	538	61.0	86.6	61.0	86.6	61.1	62.9	6322	72.2
1976	3986.2	537	84.3	86.2	84.3	86.2	84.5	66.6	8033	91.5
1977	3570.7	536	75.9	84.7	75.9	84.7	76.0	68.0	7001	79.9
1978	3856.2	536	81.7	84.3	81.7	84.3	82.1	69.8	7638	87.2
1979	4399.7	536	93.4	85.4	93.4	85.4	93.7	72.5	8549	97.6
1980	3455.5	536	79.0	84.7	78.2	84.6	73.4	72.6	6876	78.3
1981	3262.3	536	72.3	83.6	72.3	83.5	69.5	72.3	6362	72.6
1982	2425.1	525	62.2	81.8	62.2	81.7	52.7	70.7	5543	63.3
1983	4147.7	525	96.3	82.9	96.3	82.8	90.2	72.2	8438	96.3
1984	279.1	525	9.2	77.6	9.2	77.6	6.1	67.5	808	9.2
1985	4287.0	536	91.6	78.6	91.6	78.5	91.3	69.1	8028	91.6
1986	3379.9	536	78.8	78.6	78.8	78.5	72.0	69.3	6926	79.1
1987	3535.6	536	80.2	78.7	80.2	78.6	75.3	69.6	7051	80.5
1988	4573.6	536	99.7	79.9	99.7	79.8	97.1	71.2	8759	99.7
1989	2650.4	536	74.7	79.6	74.7	79.6	56.4	70.4	6578	75.1
1990	4505.9	536	96.0	80.4	96.0	80.4	96.0	71.7	8414	96.1
1991	3596.5	536	79.6	80.4	79.6	80.4	76.6	71.9	6996	79.9
1992	4453.7	536	97.0	81.2	97.0	81.1	94.6	73.0	8527	97.1
1993	3864.4	536	83.4	81.3	83.4	81.2	82.3	73.4	7322	83.6
1994	3956.2	536	85.6	81.4	85.6	81.4	84.3	73.8	7508	85.7
1995	4756.3	536	100.0	82.2	100.0	82.2	101.3	75.0	8760	100.0
1996	3872.9	541	84.8	82.3	84.8	82.3	81.4	75.2	7443	84.7
1997	3661.6	544	75.2	82.0	75.2	82.0	76.8	75.3	6609	75.4
1998	4118.9	553	87.7	82.2	87.7	82.2	84.9	75.6	7659	87.4
1999	4649.3	578	92.4	82.6	92.4	82.6	91.8	76.2	8092	92.4
2000	4251.4	578	83.5	82.6	83.5	82.6	83.7	76.5	7332	83.5
2001	3880.6	578	76.9	82.4	76.9	82.4	76.6	76.5	6774	77.3
2002	5015.6	578	98.4	83.0	98.4	83.0	99.1	77.3	8620	98.4
2003	4592.5	578	90.7	83.2	90.7	83.2	90.7	77.7	7969	91.0
2004	5034.9	578	98.9	83.7	98.9	83.7	99.2	78.4	8689	98.9
2005	4474.9	569	89.4	83.9	89.4	83.9	89.8	78.7	7826	89.3
2006	5072.6	572	100.0	84.4	100.0	84.3	101.2	79.4	8760	100.0
2007	4192.3	572	83.7	84.3	83.7	84.3	83.7	79.5	7327	83.6
2008	4878.0	572	95.6	84.7	95.6	84.6	97.1	80.0	8398	95.6
2009	4144.7	572	84.7	84.7	84.7	84.6	82.7	80.1	7421	84.7
2010	4695.1	572	97.1	85.0	97.1	85.0	93.7	80.4	8504	97.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					225	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling				945		
D. Inspection, maintenance or repair without refuelling	255			107		
E. Testing of plant systems or components				0	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0	1	
H. Nuclear regulatory requirements						7
J. Grid limitation, failure or grid unavailability					0	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				1	82	
Subtotal	255	0	0	1053	314	7
Total		255			1374	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		10
12. Reactor I&C Systems		14
13. Reactor Auxiliary Systems		9
14. Safety Systems		16
15. Reactor Cooling Systems		22
16. Steam generation systems		2
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		22
32. Feedwater and Main Steam System		48
33. Circulating Water System		0
35. All other I&C Systems		5
41. Main Generator Systems		12
42. Electrical Power Supply Systems		28
XX. Miscellaneous Systems		20
Total	0	211

US-220 NINE MILE POINT-1

Operator: CONSTELL (CONSTELLATION Energy Nuclear Group, LLC)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 621.0 MW(e)
Design Net Capacity: 620.0 MW(e)
Design Discharge Burnup: 26000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5294.1 GW(e).h
Energy Availability Factor: 99.1%
Load Factor: 97.3%
Operating Factor: 99.1%
Energy Unavailability Factor: 0.9%
Total Off-line Time: 83 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	445.2	397.7	465.2	448.4	457.9	435.4	445.2	448.8	435.4	460.3	388.9	465.7	5294.1
EAFF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.5	100.0	99.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.5	100.0	99.1
LF (%)	96.4	95.3	100.8	100.3	99.1	97.4	96.3	97.1	97.4	99.6	86.9	100.8	97.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	88.5	100.0	99.1
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.5	0.0	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 04 Dec 1965
Date of First Criticality: 09 May 1969
Date of Grid Connection: 11 Sep 1969
Date of Commercial Operation: 12 Jan 1969
Lifetime Generation: 151396.2 GW(e).h
Cumulative Energy Availability Factor: 75.1%
Cumulative Load Factor: 70.4%
Cumulative Unit Capability Factor: 75.1%
Cumulative Energy Unavailability Factor: 24.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1969			Data not provided							
1970	1581.0	525	100.0	100.0	100.0	100.0	34.4	34.4	3443	39.3
1971	3033.1	592	100.0	100.0	100.0	100.0	58.5	47.2	5963	68.1
1972	3344.8	630	100.0	100.0	100.0	100.0	60.4	52.0	6101	69.5
1973	3494.2	610	76.4	93.9	76.4	93.9	65.4	55.4	6682	76.3
1974	3278.7	610	70.5	89.1	70.5	89.1	61.4	56.6	6177	70.5
1975	3044.9	610	57.0	83.6	57.0	83.6	57.0	56.7	6235	71.2
1976	4112.8	610	76.8	82.6	76.8	82.6	76.8	59.6	7724	87.9
1977	2956.8	610	55.4	79.2	55.4	79.2	55.3	59.1	5171	59.0
1978	4467.4	610	83.6	79.7	83.6	79.7	83.6	61.8	8329	95.1
1979	3005.4	610	56.2	77.3	56.2	77.3	56.2	61.3	5785	66.0
1980	4537.3	610	92.2	78.7	92.2	78.7	84.7	63.4	8097	92.2
1981	3270.3	610	65.6	77.6	65.6	77.6	61.2	63.3	5780	66.0
1982	1134.8	610	21.5	73.2	21.5	73.2	21.2	60.0	1872	21.4
1983	2802.0	610	56.2	72.0	56.2	72.0	52.4	59.4	4925	56.2
1984	3635.2	610	71.6	72.0	71.6	72.0	67.8	60.0	6316	71.9
1985	4932.3	610	96.4	73.5	96.4	73.5	92.3	62.0	8441	96.4
1986	3146.9	610	64.9	73.0	64.9	73.0	58.9	61.9	5722	65.3
1987	4615.2	610	92.8	74.1	92.8	74.1	86.4	63.2	8130	92.8
1988	0.0	610	0.0	70.2	0.0	70.2	0.0	59.9	0	0.0
1989	0.0	610	0.0	66.6	0.0	66.6	0.0	56.9	0	0.0
1990	1316.7	612	34.2	65.1	34.2	65.1	24.6	55.3	3043	34.7
1991	3873.5	615	78.2	65.7	78.2	65.7	71.9	56.1	6853	78.2
1992	2930.1	615	57.4	65.3	57.4	65.3	54.2	56.0	5052	57.5
1993	4353.4	615	84.1	66.1	84.1	66.1	80.8	57.0	7370	84.1
1994	4918.0	565	95.4	67.2	95.4	67.2	99.4	58.6	8390	95.8
1995	4127.6	565	82.9	67.8	82.9	67.8	83.4	59.5	7381	84.3
1996	4676.2	565	92.0	68.6	92.0	68.6	94.2	60.7	8133	92.6
1997	2698.6	565	51.8	68.0	51.8	68.0	54.5	60.5	4620	52.7
1998	4846.0	565	92.3	68.8	92.3	68.8	97.9	61.7	8085	92.3
1999	3564.9	565	68.4	68.8	68.4	68.8	72.0	62.0	6162	70.3
2000	4681.8	565	91.0	69.5	91.0	69.5	94.3	63.0	8060	91.8
2001	4378.0	565	83.5	69.9	83.5	69.9	88.5	63.8	7376	84.2
2002	4904.6	565	92.9	70.6	92.9	70.6	99.1	64.8	8194	93.5
2003	4361.4	565	83.6	70.9	83.6	70.9	88.1	65.4	7373	84.2
2004	4988.2	565	93.5	71.5	93.5	71.5	100.5	66.4	8258	94.0
2005	4589.8	621	87.5	72.0	87.5	72.0	84.4	66.9	7667	87.5
2006	5346.9	621	99.5	72.8	99.5	72.8	98.3	67.8	8713	99.5
2007	4762.9	621	90.3	73.3	90.3	73.3	87.6	68.3	7910	90.3
2008	5341.4	621	99.1	74.0	99.1	74.0	97.9	69.1	8707	99.1
2009	4992.6	621	93.8	74.5	93.8	74.5	91.8	69.7	8216	93.8
2010	5294.1	621	99.1	75.1	99.1	75.1	97.3	70.4	8677	99.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		82		0	692	
B. Refuelling without a maintenance					28	
C. Inspection, maintenance or repair combined with refuelling				1201		
D. Inspection, maintenance or repair without refuelling				135		
E. Testing of plant systems or components				3	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				2		
H. Nuclear regulatory requirements				0	4	5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				4	134	
Subtotal	0	82	0	1345	858	5
Total		82			2208	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		12
12. Reactor I&C Systems		32
13. Reactor Auxiliary Systems		25
14. Safety Systems		55
15. Reactor Cooling Systems	82	311
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		41
32. Feedwater and Main Steam System		53
35. All other I&C Systems		2
41. Main Generator Systems		16
42. Electrical Power Supply Systems		28
XX. Miscellaneous Systems		1
Total	82	577

US-410 NINE MILE POINT-2

Operator: CONSTELL (CONSTELLATION Energy Nuclear Group, LLC)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 1143.0 MW(e)
Design Net Capacity: 1100.0 MW(e)
Design Discharge Burnup: 32300 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8945.0 GW(e).h
Energy Availability Factor: 90.6%
Load Factor: 89.3%
Operating Factor: 90.6%
Energy Unavailability Factor: 9.4%
Total Off-line Time: 826 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	740.0	770.1	847.0	45.9	731.2	808.4	834.2	836.9	813.6	837.7	825.7	854.1	8945.0
EAF (%)	89.7	100.0	100.0	3.4	93.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.6
UCF (%)	89.7	100.0	100.0	3.4	93.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.6
LF (%)	87.0	100.3	99.7	5.6	86.0	98.2	98.1	98.4	98.9	98.5	100.2	100.4	89.3
OF (%)	89.7	100.0	100.0	6.1	90.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.6
EUf (%)	10.3	0.0	0.0	96.6	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
PUf (%)	0.0	0.0	0.0	96.6	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
UCLF (%)	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1975
Date of First Criticality: 23/05/1987
Date of Grid Connection: 08 Aug 1987
Date of Commercial Operation: 03 Nov 1988

Lifetime Generation: 178854.0 GW(e).h
Cumulative Energy Availability Factor: 83.9%
Cumulative Load Factor: 81.1%
Cumulative Unit Capability Factor: 83.9%
Cumulative Energy Unavailability Factor: 16.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	2540.6	1040	49.1	49.1	49.1	49.1	33.6	33.6	2800	38.6
1989	4288.3	1068	56.4	53.2	56.4	53.2	45.8	40.4	4824	55.1
1990	4140.4	1082	54.4	53.6	54.4	53.6	43.7	41.5	4697	53.6
1991	6562.9	1092	75.1	59.3	75.1	59.3	68.6	48.7	6484	74.0
1992	5145.0	1075	61.8	59.9	61.8	59.9	54.5	49.9	5169	58.8
1993	7191.1	1048	82.2	63.6	82.2	63.6	78.3	54.7	7195	82.1
1994	8355.9	994	93.9	67.8	93.9	67.8	96.0	60.4	8243	94.1
1995	7253.7	1061	78.9	69.2	78.9	69.2	78.0	62.6	6848	78.2
1996	8698.5	1106	89.7	71.6	89.7	71.6	89.5	65.8	7811	88.9
1997	8878.0	1105	94.9	74.1	94.9	74.1	91.7	68.5	8279	94.5
1998	7307.2	1105	80.8	74.7	80.8	74.7	75.5	69.2	7028	80.2
1999	8782.3	1128	89.1	76.0	89.1	76.0	88.9	70.9	7810	89.2
2000	8001.5	1123	81.7	76.5	81.7	76.5	81.1	71.8	7204	82.0
2001	8858.8	1119	90.7	77.5	90.7	77.5	90.4	73.1	7964	90.9
2002	8417.5	1119	85.1	78.1	85.1	78.1	85.9	74.0	7473	85.3
2003	9566.9	1119	96.4	79.2	96.4	79.2	97.6	75.6	8448	96.4
2004	8643.5	1119	88.5	79.8	88.5	79.8	87.9	76.3	7788	88.7
2005	9961.0	1135	100.0	81.0	100.0	81.0	100.2	77.7	8760	100.0
2006	9081.6	1135	92.5	81.6	92.5	81.6	91.3	78.5	8100	92.5
2007	9201.1	1140	94.6	82.3	94.6	82.3	92.1	79.2	8286	94.6
2008	9082.4	1140	91.8	82.8	91.8	82.8	90.7	79.8	8063	91.8
2009	9921.9	1142	100.0	83.6	100.0	83.6	99.2	80.7	8760	100.0
2010	8945.0	1143	90.6	83.9	90.6	83.9	89.3	81.1	7934	90.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		76			376	
B. Refuelling without a maintenance					18	
C. Inspection, maintenance or repair combined with refuelling	747			667		
D. Inspection, maintenance or repair without refuelling				298	1	
E. Testing of plant systems or components				2		
J. Grid limitation, failure or grid unavailability					3	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					41	
Subtotal	747	76	0	967	439	0
Total		823			1406	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems	76	7
13. Reactor Auxiliary Systems		0
14. Safety Systems		10
15. Reactor Cooling Systems		57
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		32
32. Feedwater and Main Steam System		55
33. Circulating Water System		14
35. All other I&C Systems		47
41. Main Generator Systems		31
42. Electrical Power Supply Systems		61
Total	76	317

2010 Operating Experience

US-338 NORTH ANNA-1

Operator: DOMINION (DOMINION GENERATION)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 903.0 MW(e)
Design Net Capacity: 907.0 MW(e)
Design Discharge Burnup: 39000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6779.9 GW(e).h
Energy Availability Factor: 85.6%
Load Factor: 85.7%
Operating Factor: 85.6%
Energy Unavailability Factor: 14.4%
Total Off-line Time: 1264 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	682.1	614.9	679.4	655.7	677.7	633.4	568.0	685.3	241.4	13.4	634.4	694.2	6779.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	85.7	100.0	36.7	6.0	100.0	100.0	85.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	85.7	100.0	36.7	6.1	100.0	100.0	85.6
LF (%)	101.5	101.3	101.3	100.9	100.9	97.4	84.5	102.0	37.1	2.0	97.4	103.3	85.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	85.6	100.0	36.7	5.8	100.0	100.0	85.6
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0	63.3	94.0	0.0	0.0	14.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	63.3	94.0	0.0	0.0	13.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	1.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/02/1971 **Lifetime Generation:** 205746.5 GW(e).h
Date of First Criticality: 04 May 1978 **Cumulative Energy Availability Factor:** 82.3%
Date of Grid Connection: 17/04/1978 **Cumulative Load Factor:** 80.0%
Date of Commercial Operation: 06 Jun 1978 **Cumulative Unit Capability Factor:** 82.3%
Cumulative Energy Unavailability Factor: 17.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1978	3664.5	896	81.4	81.4	81.4	81.4	79.5	79.5	4769	92.9
1979	4188.7	898	53.2	63.7	53.2	63.7	53.2	62.9	5399	61.6
1980	5631.0	878	87.2	72.7	87.2	72.7	73.0	66.8	7589	86.4
1981	4637.9	860	65.6	70.7	65.6	70.7	61.6	65.4	5703	65.1
1982	2397.9	865	34.7	63.0	34.7	63.0	31.6	58.1	3027	34.6
1983	5310.4	872	71.6	64.5	71.6	64.5	69.5	60.2	6277	71.7
1984	3784.8	883	50.3	62.4	50.3	62.4	48.8	58.4	4425	50.4
1985	5798.9	892	77.9	64.4	77.9	64.4	74.2	60.5	6820	77.9
1986	6310.7	893	83.7	66.7	83.7	66.7	80.7	62.9	7327	83.6
1987	3568.9	913	52.1	65.1	52.1	65.1	44.6	60.9	4523	51.6
1988	6897.3	915	88.6	67.4	88.6	67.4	85.8	63.4	7760	88.3
1989	4303.3	915	57.8	66.6	57.8	66.6	53.7	62.5	4978	56.8
1990	7233.5	912	99.6	69.3	99.6	69.3	90.5	64.8	8726	99.6
1991	5625.8	911	75.2	69.7	75.2	69.7	70.5	65.2	6549	74.8
1992	5358.1	858	81.5	70.5	81.5	70.5	71.1	65.6	7225	82.3
1993	5692.6	890	73.5	70.7	73.5	70.7	73.0	66.1	6444	73.6
1994	6795.7	900	91.6	71.9	91.6	71.9	86.2	67.3	8012	91.5
1995	7839.2	896	99.7	73.5	99.7	73.5	99.8	69.2	8733	99.7
1996	6945.5	893	91.0	74.5	91.0	74.5	88.5	70.2	7985	90.9
1997	7157.5	893	91.3	75.3	91.3	75.3	91.5	71.3	7992	91.2
1998	7217.1	893	92.4	76.2	92.4	76.2	92.3	72.3	8091	92.4
1999	8124.5	893	100.0	77.3	100.0	77.3	103.9	73.8	8760	100.0
2000	7213.1	893	91.1	77.9	91.1	77.9	92.0	74.6	7997	91.0
2001	7120.8	925	91.5	78.5	91.5	78.5	87.9	75.2	8010	91.4
2002	8164.3	925	100.0	79.4	100.0	79.4	100.8	76.2	8760	100.0
2003	6519.9	925	82.2	79.5	82.2	79.5	80.5	76.4	7200	82.2
2004	7418.4	925	91.4	80.0	91.4	80.0	91.3	77.0	8023	91.3
2005	8091.9	925	99.8	80.7	99.8	80.7	99.9	77.8	8744	99.8
2006	7142.7	924	89.8	81.0	89.8	81.0	88.2	78.2	7861	89.7
2007	7215.1	903	89.4	81.3	89.4	81.3	91.2	78.7	7854	89.7
2008	7986.8	903	100.0	81.9	100.0	81.9	100.7	79.4	8784	100.0
2009	7302.5	903	91.5	82.2	91.5	82.2	92.3	79.8	8017	91.5
2010	6779.9	903	85.6	82.3	85.6	82.3	85.7	80.0	7496	85.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1978 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		106			387	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1155			957		
D. Inspection, maintenance or repair without refuelling				109		
E. Testing of plant systems or components				9	3	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	2	
Subtotal	1155	106	0	1075	396	0
Total		1261			1471	

7. Equipment Related Full Outages, Analysis by System

System	2010	1978 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		11
14. Safety Systems		17
15. Reactor Cooling Systems		43
16. Steam generation systems	106	107
31. Turbine and auxiliaries		50
32. Feedwater and Main Steam System		18
33. Circulating Water System		3
41. Main Generator Systems		9
42. Electrical Power Supply Systems		84
Total	106	358

US-339 NORTH ANNA-2

Operator: DOMINION (DOMINION GENERATION)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 903.0 MW(e)
Design Net Capacity: 907.0 MW(e)
Design Discharge Burnup: 39000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6619.5 GW(e).h
Energy Availability Factor: 81.9%
Load Factor: 79.6%
Operating Factor: 81.0%
Energy Unavailability Factor: 18.1%
Total Off-line Time: 1667 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	679.6	613.3	435.3	28.3	622.3	542.2	700.1	702.0	640.4	283.9	645.2	726.9	6619.5
EAF (%)	100.0	100.0	64.5	9.1	88.0	83.9	100.0	100.0	93.8	45.9	94.4	100.0	81.9
UCF (%)	100.0	100.0	64.5	9.1	88.0	84.0	100.0	100.0	93.8	45.9	94.4	100.0	81.9
LF (%)	101.2	101.1	64.9	4.4	86.1	77.5	96.8	97.1	91.5	39.3	92.1	100.5	79.6
OF (%)	100.0	100.0	64.5	9.0	87.1	82.6	100.0	100.0	93.3	41.5	93.9	100.0	81.0
EUf (%)	0.0	0.0	35.5	90.9	12.0	16.1	0.0	0.0	6.2	54.1	5.6	0.0	18.1
PUF (%)	0.0	0.0	35.5	84.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5
UCLF (%)	0.0	0.0	0.0	6.6	12.0	16.1	0.0	0.0	6.2	54.1	5.6	0.0	8.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/02/1971
Date of First Criticality: 06 Dec 1980
Date of Grid Connection: 25/08/1980
Date of Commercial Operation: 14/12/1980

Lifetime Generation: 198669.3 GW(e).h
Cumulative Energy Availability Factor: 85.6%
Cumulative Load Factor: 83.1%
Cumulative Unit Capability Factor: 85.6%
Cumulative Energy Unavailability Factor: 14.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1980	349.6	897	97.5	97.5	97.5	97.5	90.1	90.1	412	95.4
1981	5652.7	883	78.4	79.3	78.4	79.3	73.1	73.9	6813	77.8
1982	4047.2	890	57.3	68.5	57.3	68.5	51.9	63.1	4990	57.0
1983	5802.5	890	80.7	72.5	80.7	72.5	74.4	66.8	7052	80.5
1984	4717.2	890	67.1	71.2	67.1	71.2	60.3	65.2	5896	67.1
1985	6813.6	892	94.2	75.8	94.2	75.8	87.2	69.6	8252	94.2
1986	6022.1	893	82.2	76.9	82.2	76.9	77.0	70.8	7208	82.3
1987	5653.4	905	77.4	76.9	77.4	76.9	71.2	70.9	6783	77.4
1988	7884.0	915	99.2	79.8	99.2	79.8	98.1	74.3	8708	99.1
1989	5896.5	915	80.2	79.8	80.2	79.8	73.6	74.3	6887	78.6
1990	5976.6	910	80.0	79.8	80.0	79.8	74.9	74.3	6982	79.7
1991	7684.3	909	97.5	81.4	97.5	81.4	96.5	76.3	8539	97.5
1992	6324.7	909	82.6	81.5	82.6	81.5	79.2	76.6	7237	82.4
1993	6225.2	909	83.6	81.7	83.6	81.7	78.2	76.7	7303	83.4
1994	7490.3	887	97.2	82.8	97.2	82.8	96.4	78.1	8517	97.2
1995	6031.7	892	80.8	82.7	80.8	82.7	77.2	78.0	7086	80.9
1996	6121.5	897	78.1	82.4	78.1	82.4	77.7	78.0	6859	78.1
1997	7834.8	897	99.7	83.4	99.7	83.4	99.7	79.3	8738	99.7
1998	7086.1	897	92.1	83.9	91.9	83.9	90.2	79.9	8049	91.9
1999	7185.1	897	91.7	84.3	91.7	84.3	91.4	80.5	8034	91.7
2000	8018.9	897	99.4	85.0	99.4	85.0	101.8	81.5	8729	99.4
2001	5975.8	917	77.4	84.7	77.4	84.7	74.4	81.2	6776	77.4
2002	5509.7	917	68.5	83.9	68.5	83.9	68.6	80.6	6000	68.5
2003	7262.8	917	90.8	84.2	90.8	84.2	90.4	81.1	7950	90.8
2004	7388.1	917	92.0	84.6	92.0	84.5	91.7	81.5	8077	92.0
2005	7293.5	917	92.1	84.9	91.7	84.8	90.8	81.9	8034	91.7
2006	7950.4	910	99.7	85.4	99.7	85.4	99.7	82.6	8732	99.7
2007	6771.8	903	85.8	85.4	85.8	85.4	85.6	82.7	7524	85.9
2008	6446.6	903	81.2	85.3	81.2	85.3	81.3	82.6	7132	81.2
2009	7900.1	903	99.2	85.8	99.2	85.8	99.9	83.2	8688	99.2
2010	6619.5	972	81.9	85.6	81.9	85.6	79.6	83.1	7093	81.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1980 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		535			228	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling	871			803		
D. Inspection, maintenance or repair without refuelling				68		
E. Testing of plant systems or components				2		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					58	0
L. Human factor related		37				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)			220			1
Subtotal	871	572	220	873	297	1
Total		1663			1171	

7. Equipment Related Full Outages, Analysis by System

System	2010	1980 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		3
13. Reactor Auxiliary Systems		2
14. Safety Systems		20
15. Reactor Cooling Systems		21
16. Steam generation systems		35
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries	9	8
32. Feedwater and Main Steam System		17
33. Circulating Water System		0
41. Main Generator Systems	43	42
42. Electrical Power Supply Systems		73
XX. Miscellaneous Systems	481	
Total	533	222

US-269 OCONEE-1

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 846.0 MW(e)
 Design Net Capacity: 887.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7433.8 GW(e).h
 Energy Availability Factor: 99.3%
 Load Factor: 100.3%
 Operating Factor: 99.3%
 Energy Unavailability Factor: 0.7%
 Total Off-line Time: 65 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	646.3	583.7	645.5	622.5	641.8	620.1	637.5	561.0	605.7	631.9	595.2	642.5	7433.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.0	100.0	100.0	97.3	100.0	99.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.0	100.0	100.0	97.3	100.0	99.3
LF (%)	102.7	102.7	102.7	102.2	102.0	101.8	101.3	89.1	99.4	100.4	97.6	102.1	100.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.0	100.0	100.0	97.2	100.0	99.3
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	2.7	0.0	0.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	2.7	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jun 1967
 Date of First Criticality: 19/04/1973
 Date of Grid Connection: 05 Jun 1973
 Date of Commercial Operation: 15/07/1973
 Lifetime Generation: 215863.8 GW(e).h
 Cumulative Energy Availability Factor: 80.2%
 Cumulative Load Factor: 77.1%
 Cumulative Unit Capability Factor: 80.4%
 Cumulative Energy Unavailability Factor: 19.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation									
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online			
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]		
1973	1959.1	721	70.5	70.5	70.5	70.5	67.3	67.3	67.3	67.3	3350	75.9
1974	4230.3	920	100.0	92.2	100.0	92.2	52.5	56.4	51.41	58.7	5141	58.7
1975	5299.3	871	69.5	82.9	69.5	82.9	69.5	61.8	66.72	76.2	6672	76.2
1976	4003.5	871	52.4	74.0	52.4	74.0	52.3	59.0	50.29	57.3	5029	57.3
1977	3949.0	860	52.5	69.2	52.5	69.2	52.4	57.5	54.55	62.3	5455	62.3
1978	5054.4	860	67.1	68.8	67.1	68.8	67.1	59.3	62.99	71.9	6299	71.9
1979	5003.1	860	66.4	68.4	66.4	68.4	66.4	60.4	62.20	71.0	6220	71.0
1980	5118.3	860	86.3	70.8	76.2	69.5	67.8	61.4	66.34	75.5	6634	75.5
1981	3023.2	860	42.9	67.5	42.9	66.4	40.1	58.9	36.57	41.7	3657	41.7
1982	5152.8	860	73.5	68.2	73.5	67.1	68.4	59.9	63.35	72.3	6335	72.3
1983	5672.0	860	78.4	69.2	78.4	68.2	75.3	61.3	68.04	77.7	6804	77.7
1984	6173.7	860	83.6	70.4	83.6	69.5	81.7	63.1	73.12	83.2	7312	83.2
1985	7066.0	860	96.2	72.5	96.2	71.7	93.8	65.6	84.24	96.2	8424	96.2
1986	4793.9	860	70.2	72.3	70.2	71.6	63.6	65.4	58.70	67.0	5870	67.0
1987	5031.1	860	76.8	72.6	76.8	71.9	66.8	65.5	66.93	76.4	6693	76.4
1988	7192.2	846	99.5	74.3	99.5	73.7	96.8	67.5	87.42	99.5	8742	99.5
1989	5943.1	846	82.9	74.9	82.9	74.2	80.2	68.3	72.64	82.9	7264	82.9
1990	6454.8	846	88.5	75.6	88.5	75.0	87.1	69.3	77.51	88.5	7751	88.5
1991	6022.5	846	82.7	76.0	82.7	75.4	81.3	70.0	72.45	82.7	7245	82.7
1992	6277.7	846	85.3	76.5	85.3	76.0	84.5	70.7	74.94	85.3	7494	85.3
1993	6525.1	846	89.4	77.1	89.4	76.6	88.0	71.5	78.33	89.4	7833	89.4
1994	6088.7	846	83.4	77.4	83.4	76.9	82.2	72.0	73.02	83.4	7302	83.4
1995	6360.5	846	86.1	77.8	86.1	77.3	85.8	72.6	75.37	86.0	7537	86.0
1996	5567.0	846	75.2	77.7	75.2	77.2	74.9	72.7	66.06	75.2	6606	75.2
1997	3194.2	846	51.3	76.6	51.3	76.2	43.1	71.5	44.82	51.2	4482	51.2
1998	5996.4	846	82.8	76.8	82.8	76.4	80.9	71.9	72.55	82.8	7255	82.8
1999	6212.6	846	85.1	77.1	85.1	76.8	83.8	72.4	73.83	84.3	7383	84.3
2000	6312.7	846	84.8	77.4	84.8	77.1	84.9	72.8	74.45	84.8	7445	84.8
2001	6962.6	846	94.0	78.0	94.0	77.6	94.0	73.5	82.10	93.7	8210	93.7
2002	6607.5	846	88.9	78.4	88.9	78.0	89.2	74.1	77.88	88.9	7788	88.9
2003	5258.6	846	71.8	78.2	71.8	77.8	71.0	74.0	62.88	71.8	6288	71.8
2004	7260.2	846	97.3	78.8	97.3	78.4	97.7	74.7	85.49	97.3	8549	97.3
2005	6728.6	846	90.0	79.1	90.0	78.8	90.8	75.2	78.79	89.9	7879	89.9
2006	5819.4	846	78.6	79.1	78.6	78.8	78.5	75.3	68.84	78.6	6884	78.6
2007	7335.7	846	97.7	79.6	97.7	79.3	99.0	76.0	85.62	97.7	8562	97.7
2008	6222.8	846	86.1	79.8	86.1	79.5	83.7	76.2	75.64	86.1	7564	86.1
2009	6316.6	846	84.4	79.9	84.4	79.6	85.2	76.4	73.93	84.4	7393	84.4
2010	7433.8	846	99.3	80.4	99.3	80.2	100.3	77.1	86.95	99.3	8695	99.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		64			535	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				898		
D. Inspection, maintenance or repair without refuelling				149	2	
E. Testing of plant systems or components				21	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements				2	0	30
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	0
Subtotal	0	64	0	1070	538	30
Total		64			1638	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		42
12. Reactor I&C Systems		59
13. Reactor Auxiliary Systems		2
14. Safety Systems		38
15. Reactor Cooling Systems		114
16. Steam generation systems		149
17. Safety I&C Systems (excluding reactor I&C)	44	0
21. Fuel Handling and Storage Facilities		0
31. Turbine and auxiliaries		46
32. Feedwater and Main Steam System		18
41. Main Generator Systems		10
42. Electrical Power Supply Systems	19	15
XX. Miscellaneous Systems		19
Total	63	512

US-270 OCONEE-2

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 846.0 MW(e)
 Design Net Capacity: 887.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6734.3 GW(e).h
 Energy Availability Factor: 89.4%
 Load Factor: 90.9%
 Operating Factor: 89.4%
 Energy Unavailability Factor: 10.6%
 Total Off-line Time: 931 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	649.7	563.4	648.4	500.2	0.0	562.5	645.1	637.3	613.2	641.1	625.0	648.6	6734.3
EAF (%)	100.0	100.0	100.0	80.0	-0.7	95.1	100.0	100.0	100.0	100.0	100.0	100.0	89.4
UCF (%)	100.0	100.0	100.0	80.0	-0.7	95.1	100.0	100.0	100.0	100.0	100.0	100.0	89.4
LF (%)	103.2	99.1	103.1	82.1	0.0	92.3	102.5	101.2	100.7	101.9	102.5	103.0	90.9
OF (%)	100.0	100.0	100.0	80.0	2.0	91.9	100.0	100.0	100.0	100.0	100.0	100.0	89.4
EUF (%)	0.0	0.0	0.0	20.0	100.7	4.9	0.0	0.0	0.0	0.0	0.0	0.0	10.6
PUF (%)	0.0	0.0	0.0	20.0	94.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6
UCLF (%)	0.0	0.0	0.0	0.0	6.5	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jun 1967
 Date of First Criticality: 11 Nov 1973
 Date of Grid Connection: 12 May 1973
 Date of Commercial Operation: 09 Sep 1974
 Lifetime Generation: 216507.9 GW(e).h
 Cumulative Energy Availability Factor: 81.6%
 Cumulative Load Factor: 79.5%
 Cumulative Unit Capability Factor: 81.9%
 Cumulative Energy Unavailability Factor: 18.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1470.1	920	100.0	100.0	100.0	100.0	54.6	54.6	1812	61.9
1975	4970.6	871	65.2	74.3	65.2	74.3	65.1	62.4	6398	73.0
1976	4232.6	871	55.4	66.2	55.4	66.2	55.3	59.4	5483	62.4
1977	3830.0	860	50.9	61.7	50.9	61.7	50.8	56.9	5315	60.7
1978	4786.2	860	63.5	62.1	63.5	62.1	63.5	58.4	6155	70.3
1979	5968.2	860	79.2	65.3	79.2	65.3	79.2	62.2	7532	86.0
1980	3882.0	860	69.6	66.0	62.0	64.8	51.4	60.5	5397	61.4
1981	5198.9	860	81.0	68.0	81.0	67.0	69.0	61.7	7050	80.5
1982	3447.7	860	53.5	66.3	53.5	65.4	45.8	59.8	4580	52.3
1983	5147.0	860	73.2	67.0	73.2	66.2	68.3	60.7	6348	72.5
1984	7298.0	860	100.0	70.2	100.0	69.5	96.6	64.2	8784	100.0
1985	5060.0	860	76.3	70.7	76.3	70.1	67.2	64.4	6654	76.0
1986	5803.1	860	81.4	71.6	81.4	71.0	77.0	65.4	7169	81.8
1987	6228.7	860	98.0	73.6	98.0	73.0	82.7	66.7	8565	97.8
1988	5540.0	846	78.3	73.9	78.3	73.4	74.5	67.3	6880	78.3
1989	6013.1	846	83.1	74.5	83.1	74.0	81.1	68.2	7272	83.0
1990	6269.4	846	85.3	75.1	85.3	74.7	84.6	69.1	7469	85.3
1991	7427.9	846	100.0	76.5	100.0	76.1	100.2	70.9	8760	100.0
1992	5946.9	846	80.9	76.8	80.9	76.4	80.0	71.4	7103	80.9
1993	6236.3	846	83.9	77.1	83.9	76.7	84.1	72.1	7352	83.9
1994	6148.5	846	83.3	77.4	83.3	77.1	83.0	72.6	7292	83.2
1995	6973.9	846	94.3	78.2	94.3	77.9	94.1	73.6	8263	94.3
1996	4432.0	846	60.4	77.4	60.4	77.1	59.6	73.0	5304	60.4
1997	5876.8	846	79.7	77.5	79.7	77.2	79.3	73.2	6974	79.6
1998	5654.7	846	77.4	77.5	77.4	77.2	76.3	73.4	6776	77.4
1999	6257.6	846	84.2	77.8	84.2	77.5	84.4	73.8	7374	84.2
2000	7499.5	846	100.0	78.6	100.0	78.3	100.9	74.8	8784	100.0
2001	6688.4	846	89.5	79.0	89.5	78.7	90.3	75.4	7836	89.5
2002	6611.1	846	88.4	79.3	88.4	79.1	89.2	75.8	7743	88.4
2003	7568.7	846	100.0	80.0	100.0	79.8	102.1	76.7	8760	100.0
2004	5676.1	846	75.8	79.9	75.8	79.6	76.4	76.7	6652	75.7
2005	6672.3	846	89.1	80.2	89.1	79.9	90.0	77.1	7808	89.1
2006	7391.9	846	97.6	80.7	97.6	80.5	99.7	77.8	8552	97.6
2007	6769.0	846	90.0	81.0	90.0	80.8	91.3	78.2	7878	89.9
2008	6392.5	846	85.1	81.1	85.1	80.9	86.0	78.5	7470	85.0
2009	7607.0	846	100.0	81.6	100.0	81.4	102.6	79.1	8760	100.0
2010	6734.3	846	89.4	81.9	89.4	81.6	90.9	79.5	7829	89.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		83		0	530	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	845			865		
D. Inspection, maintenance or repair without refuelling				62	2	
E. Testing of plant systems or components				5	1	
H. Nuclear regulatory requirements				0		28
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					0	
L. Human factor related					0	
Subtotal	845	83	0	932	534	28
Total		928			1494	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		39
12. Reactor I&C Systems		57
13. Reactor Auxiliary Systems		10
14. Safety Systems		42
15. Reactor Cooling Systems	83	98
16. Steam generation systems		106
31. Turbine and auxiliaries		143
32. Feedwater and Main Steam System		8
33. Circulating Water System		2
41. Main Generator Systems		4
42. Electrical Power Supply Systems		15
Total	83	524

US-287 OCONEE-3

Operator: DUKEENER (DUKE ENERGY CORP.)
 Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 846.0 MW(e)
 Design Net Capacity: 887.0 MW(e)
 Design Discharge Burnup: 30000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6778.5 GW(e).h
 Energy Availability Factor: 90.1%
 Load Factor: 91.5%
 Operating Factor: 90.1%
 Energy Unavailability Factor: 9.9%
 Total Off-line Time: 871 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	653.0	575.0	653.1	422.7	652.7	629.1	644.4	620.1	614.7	447.5	212.8	653.2	6778.5
EAF (%)	100.0	100.0	100.0	72.2	100.0	100.0	100.0	100.0	100.0	71.0	37.2	100.0	90.1
UCF (%)	100.0	100.0	100.0	72.2	100.0	100.0	100.0	100.0	100.0	71.0	37.2	100.0	90.1
LF (%)	103.8	101.1	103.9	69.4	103.7	103.3	102.4	98.5	100.9	71.1	34.9	103.8	91.5
OF (%)	100.0	100.0	100.0	72.1	100.0	100.0	100.0	100.0	100.0	71.0	37.0	100.0	90.1
EUf (%)	0.0	0.0	0.0	27.8	0.0	0.0	0.0	0.0	0.0	29.0	62.8	0.0	9.9
PUf (%)	0.0	0.0	0.0	27.8	0.0	0.0	0.0	0.0	0.0	29.0	62.8	0.0	9.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Jun 1967
 Date of First Criticality: 09 May 1974
 Date of Grid Connection: 18/09/1974
 Date of Commercial Operation: 16/12/1974
 Lifetime Generation: 212857.5 GW(e).h
 Cumulative Energy Availability Factor: 80.2%
 Cumulative Load Factor: 79.1%
 Cumulative Unit Capability Factor: 80.6%
 Cumulative Energy Unavailability Factor: 19.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974			Data not provided							
1975	5037.4	871	66.1	66.1	66.1	66.1	66.0	66.0	6761	77.2
1976	4758.0	871	62.3	64.2	62.3	64.2	62.2	64.1	6072	69.1
1977	5268.7	860	69.9	66.1	69.9	66.1	69.9	66.0	6545	74.7
1978	6064.3	860	80.5	69.6	80.5	69.6	80.5	69.6	7444	85.0
1979	3278.9	860	43.5	64.4	43.5	64.4	43.5	64.4	4038	46.1
1980	5224.6	860	84.8	67.8	73.8	66.0	69.2	65.2	6414	73.0
1981	5641.4	860	78.6	69.4	78.6	67.8	74.9	66.6	6835	78.0
1982	2128.4	860	33.5	64.9	33.5	63.5	28.3	61.8	2826	32.3
1983	7099.1	860	96.5	68.4	96.5	67.2	94.2	65.4	8436	96.3
1984	5355.5	860	74.2	69.0	74.2	67.9	70.9	66.0	6474	73.7
1985	4860.8	860	69.7	69.0	69.7	68.0	64.5	65.8	6071	69.3
1986	6064.3	860	90.0	70.8	90.0	69.9	80.5	67.0	7781	88.8
1987	5094.4	860	69.8	70.7	69.8	69.9	67.6	67.1	6068	69.3
1988	5965.8	846	81.9	71.5	81.9	70.7	80.3	68.0	7190	81.9
1989	6337.4	846	86.6	72.5	86.6	71.8	85.5	69.2	7585	86.6
1990	7427.8	846	99.5	74.1	99.5	73.5	100.2	71.1	8712	99.5
1991	5594.6	846	86.6	74.9	86.6	74.2	75.5	71.3	6691	76.4
1992	5448.2	846	75.5	74.9	75.5	74.3	73.3	71.4	6634	75.5
1993	7393.8	846	98.7	76.1	98.7	75.6	99.8	72.9	8647	98.7
1994	5670.8	846	77.5	76.2	77.5	75.7	76.5	73.1	6781	77.4
1995	6467.8	846	87.1	76.7	87.1	76.2	87.3	73.8	7625	87.0
1996	5454.0	846	73.2	76.6	73.2	76.1	73.4	73.7	6429	73.2
1997	4652.6	846	64.6	76.0	64.6	75.6	62.8	73.3	5633	64.3
1998	5786.4	846	80.1	76.2	80.1	75.8	78.1	73.5	7026	80.2
1999	7369.5	846	99.0	77.1	99.0	76.7	99.4	74.5	8676	99.0
2000	6577.8	846	88.0	77.5	88.0	77.1	88.5	75.0	7729	88.0
2001	5398.5	846	72.6	77.3	72.6	76.9	72.8	75.0	6355	72.5
2002	7465.5	846	99.2	78.1	99.2	77.7	100.7	75.9	8688	99.2
2003	6318.0	846	85.2	78.4	85.2	78.0	85.3	76.2	7467	85.2
2004	5747.0	846	76.3	78.3	76.3	77.9	77.3	76.2	6698	76.3
2005	7237.0	846	95.9	78.9	95.9	78.5	97.6	76.9	8395	95.8
2006	6716.2	846	89.1	79.2	89.1	78.8	90.6	77.3	7804	89.1
2007	6461.9	846	85.6	79.4	85.6	79.0	87.2	77.6	7498	85.6
2008	7575.1	846	99.2	79.9	99.2	79.6	101.9	78.3	8717	99.2
2009	6974.7	846	91.8	80.3	91.8	80.0	94.1	78.8	8041	91.8
2010	6778.5	846	90.1	80.6	90.1	80.2	91.5	79.1	7889	90.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				3	493	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	668			886		
D. Inspection, maintenance or repair without refuelling	200			109	0	
E. Testing of plant systems or components	0			7	4	
H. Nuclear regulatory requirements					76	31
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	14	0
Subtotal	868	0	0	1005	589	31
Total		868			1625	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems		91
13. Reactor Auxiliary Systems		34
14. Safety Systems		22
15. Reactor Cooling Systems		65
16. Steam generation systems		127
21. Fuel Handling and Storage Facilities		4
31. Turbine and auxiliaries		66
32. Feedwater and Main Steam System		20
41. Main Generator Systems		7
42. Electrical Power Supply Systems		5
XX. Miscellaneous Systems		16
Total	0	471

US-219 OYSTER CREEK

Operator: EXELON (Exelon Generation Co., LLC)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP at the beginning of 2010): 614.0 MW(e)
Design Net Capacity: 650.0 MW(e)
Design Discharge Burnup: 43000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4605.0 GW(e).h
Energy Availability Factor: 87.5%
Load Factor: 85.6%
Operating Factor: 87.5%
Energy Unavailability Factor: 12.5%
Total Off-line Time: 1099 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	472.8	426.3	464.1	405.3	433.4	433.1	427.7	449.9	437.5	460.7	0.0	194.3	4605.0
EAFF (%)	100.0	100.0	100.0	90.0	96.2	100.0	100.0	100.0	100.0	100.0	0.1	62.8	87.5
UCF (%)	100.0	100.0	100.0	90.0	96.2	100.0	100.0	100.0	100.0	100.0	0.1	62.8	87.5
LF (%)	103.5	103.3	101.7	91.7	94.9	98.0	93.6	98.5	99.0	100.8	0.0	42.5	85.6
OF (%)	100.0	100.0	100.0	90.8	95.2	100.0	100.0	100.0	100.0	100.0	0.0	62.9	87.5
EUFF (%)	0.0	0.0	0.0	10.0	3.8	0.0	0.0	0.0	0.0	0.0	99.9	37.2	12.5
PUFF (%)	0.0	0.0	0.0	10.0	3.8	0.0	0.0	0.0	0.0	0.0	99.9	2.7	9.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.5	2.9
XUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 15/12/1964
Date of First Criticality: 05 Mar 1969
Date of Grid Connection: 23/09/1969
Date of Commercial Operation: 12 Jan 1969
Lifetime Generation: 157404.1 GW(e).h
Cumulative Energy Availability Factor: 75.6%
Cumulative Load Factor: 70.7%
Cumulative Unit Capability Factor: 75.7%
Cumulative Energy Unavailability Factor: 24.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1969			Data not provided							
1970	3591.0	540	100.0	100.0	100.0	100.0	75.9	75.9	6788	77.5
1971	3972.6	595	100.0	100.0	100.0	100.0	76.2	76.1	7046	80.4
1972	4503.8	670	100.0	100.0	100.0	100.0	76.5	76.2	7137	81.3
1973	3589.0	620	73.8	93.3	73.8	93.3	66.1	73.6	6401	73.1
1974	3679.6	650	66.6	87.7	66.6	87.7	64.6	71.7	6163	70.4
1975	3148.7	610	59.1	82.9	59.1	82.9	58.9	69.6	6414	73.2
1976	3860.1	620	70.9	81.2	70.9	81.2	70.9	69.8	6966	79.3
1977	3249.2	620	59.9	78.5	59.9	78.5	59.8	68.5	6136	70.0
1978	3645.7	620	66.5	77.2	66.5	77.2	67.1	68.4	6508	74.3
1979	4563.3	620	83.8	77.9	83.8	77.9	84.0	70.0	7520	85.8
1980	1957.3	620	41.8	74.6	41.8	74.6	35.9	66.8	3662	41.7
1981	2628.9	620	59.9	73.3	59.9	73.3	48.4	65.3	5237	59.8
1982	2013.0	620	62.5	72.5	62.5	72.5	37.1	63.1	5474	62.5
1983	225.5	620	11.5	68.1	11.5	68.1	4.2	58.9	1007	11.5
1984	305.2	620	9.6	64.2	9.6	64.2	5.6	55.3	842	9.6
1985	3746.0	620	74.5	64.8	74.5	64.8	69.0	56.2	6518	74.4
1986	1317.7	620	26.7	62.6	26.7	62.6	24.3	54.3	2310	26.4
1987	3113.4	620	62.0	62.6	62.0	62.6	57.3	54.5	5421	61.9
1988	3547.3	620	65.5	62.7	65.5	62.7	65.1	55.0	5749	65.4
1989	2410.1	620	53.6	62.3	53.6	62.3	44.4	54.5	4686	53.5
1990	4305.1	620	87.7	63.5	87.7	63.5	79.3	55.7	7678	87.6
1991	2954.8	619	59.0	63.3	59.0	63.3	54.5	55.6	5167	59.0
1992	4531.8	610	84.9	64.2	84.9	64.2	84.6	56.9	7463	85.0
1993	4667.5	610	87.4	65.2	87.4	65.2	87.3	58.1	7654	87.4
1994	3633.3	610	69.2	65.3	69.2	65.3	67.9	58.5	6096	69.6
1995	5194.1	619	97.2	66.5	97.2	66.5	95.8	59.9	8511	97.2
1996	4339.4	619	80.9	67.1	80.9	67.1	79.8	60.7	7104	80.9
1997	5073.3	619	93.2	68.0	93.2	68.0	93.6	61.9	8164	93.2
1998	4302.2	619	81.0	68.5	81.0	68.5	79.3	62.5	7094	81.0
1999	5388.5	619	100.0	69.5	100.0	69.5	99.4	63.7	8760	100.0
2000	3908.2	619	80.6	69.9	80.6	69.9	71.9	64.0	7073	80.5
2001	5226.4	619	97.0	70.7	97.0	70.7	96.4	65.0	8497	97.0
2002	5031.3	619	93.8	71.4	93.8	71.4	92.8	65.8	8215	93.8
2003	5256.3	619	96.7	72.2	96.7	72.2	96.9	66.7	8468	96.7
2004	4847.0	619	90.8	72.7	90.8	72.7	89.1	67.4	7973	90.8
2005	5374.9	619	100.0	73.5	99.4	73.4	99.1	68.3	8706	99.4
2006	4644.5	619	88.8	73.9	88.8	73.9	85.7	68.7	7775	88.8
2007	5077.9	619	96.3	74.5	96.3	74.4	93.6	69.4	8435	96.3
2008	4664.0	619	90.2	74.9	90.2	74.9	85.8	69.8	7924	90.2
2009	4978.4	614	95.0	75.4	95.0	75.4	92.6	70.4	8320	95.0
2010	4605.0	614	87.5	75.7	87.5	75.6	85.6	70.7	7661	87.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		256			581	
B. Refuelling without a maintenance					30	
C. Inspection, maintenance or repair combined with refuelling	740			1306		
D. Inspection, maintenance or repair without refuelling	100			93		
E. Testing of plant systems or components				4	27	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements					13	7
J. Grid limitation, failure or grid unavailability					1	2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					59	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	840	256	0	1403	711	10
Total		1096			2124	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		8
14. Safety Systems		155
15. Reactor Cooling Systems	119	146
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		60
33. Circulating Water System		6
35. All other I&C Systems		6
41. Main Generator Systems		29
42. Electrical Power Supply Systems	137	32
XX. Miscellaneous Systems		4
Total	256	492

US-255 PALISADES

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 778.0 MW(e)
Design Net Capacity: 805.0 MW(e)
Design Discharge Burnup: 33205 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6240.7 GW(e).h
Energy Availability Factor: 90.4%
Load Factor: 91.6%
Operating Factor: 90.4%
Energy Unavailability Factor: 9.6%
Total Off-line Time: 845 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	605.1	546.9	593.7	562.2	594.8	445.0	523.8	579.4	556.1	52.1	582.0	599.5	6240.7
EAF (%)	100.0	100.0	100.0	100.0	100.0	76.7	94.6	100.0	100.0	14.7	100.0	100.0	90.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	76.7	94.6	100.0	100.0	14.7	100.0	100.0	90.4
LF (%)	104.5	104.6	102.7	100.4	102.8	79.4	79.4	90.5	100.1	99.3	9.0	103.8	103.6
OF (%)	100.0	100.0	100.0	100.0	100.0	78.8	92.3	100.0	100.0	14.7	100.0	100.0	90.4
EUf (%)	0.0	0.0	0.0	0.0	0.0	23.3	5.4	0.0	0.0	85.3	0.0	0.0	9.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	85.3	0.0	0.0	7.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	23.3	5.4	0.0	0.0	0.0	0.0	0.0	2.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 14/03/1967
Date of First Criticality: 24/05/1971
Date of Grid Connection: 31/12/1971
Date of Commercial Operation: 31/12/1971

Lifetime Generation: 161110.6 GW(e).h
Cumulative Energy Availability Factor: 69.8%
Cumulative Load Factor: 66.9%
Cumulative Unit Capability Factor: 70.7%
Cumulative Energy Unavailability Factor: 30.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1971			Data not provided							
1972	1899.1	400	100.0	100.0	100.0	100.0	54.0	54.0	4990	56.8
1973	2411.3	700	100.0	100.0	100.0	100.0	39.3	44.7	3829	43.7
1974	93.3	722	100.0	100.0	100.0	100.0	1.5	27.6	317	3.6
1975	2427.8	684	40.5	83.8	40.5	83.8	40.5	31.1	5649	64.5
1976	2846.9	684	47.4	76.0	47.4	76.0	47.4	34.6	4847	55.2
1977	5084.6	635	90.2	78.3	90.2	78.3	91.4	44.0	8004	91.4
1978	2624.2	635	46.0	73.7	46.0	73.7	47.2	44.5	4346	49.6
1979	3433.4	635	58.7	71.9	58.7	71.9	61.7	46.6	5241	59.8
1980	2379.1	635	80.0	72.8	39.7	68.3	42.7	46.2	3764	42.9
1981	3462.7	635	55.8	71.1	55.8	67.0	62.2	47.8	5009	57.2
1982	3345.0	635	49.3	69.1	49.3	65.4	60.1	48.9	4788	54.7
1983	3770.0	635	60.1	68.3	60.1	65.0	67.8	50.5	5282	60.3
1984	811.5	635	10.0	63.9	10.0	60.8	14.5	47.7	1334	15.2
1985	5301.8	658	82.0	65.2	82.0	62.3	91.8	51.0	7342	83.8
1986	841.2	730	14.9	61.4	14.9	58.7	13.2	48.1	1323	15.1
1987	2634.4	730	45.2	60.3	45.2	57.8	41.2	47.6	3980	45.4
1988	3435.2	730	53.7	59.8	53.7	57.5	53.6	48.0	4853	55.2
1989	3637.8	730	67.4	60.3	67.4	58.1	56.9	48.6	6019	68.7
1990	3008.1	730	56.1	60.0	56.1	58.0	47.0	48.5	5073	57.9
1991	4873.8	730	75.4	60.9	75.4	59.0	76.2	50.0	6693	76.4
1992	4865.1	730	70.5	61.4	70.5	59.6	75.9	51.3	6293	71.6
1993	3545.7	730	50.4	60.8	50.4	59.1	55.4	51.5	4595	52.5
1994	4513.8	730	65.5	61.1	65.5	59.4	70.6	52.4	5860	66.9
1995	4663.5	730	73.0	61.6	73.0	60.0	72.9	53.4	6491	74.1
1996	5314.3	730	79.7	62.4	79.7	60.9	82.9	54.6	7068	80.5
1997	5803.5	730	87.6	63.4	87.6	62.0	90.8	56.1	7714	88.1
1998	5390.6	730	81.1	64.1	81.1	62.7	84.3	57.2	7142	81.5
1999	5128.4	730	78.4	64.7	78.4	63.3	80.2	58.1	6910	78.9
2000	5748.0	730	86.8	65.5	86.8	64.2	89.6	59.3	7672	87.3
2001	2355.6	730	35.2	64.4	35.2	63.2	36.8	58.5	3118	35.6
2002	6369.4	730	94.2	65.4	93.2	64.2	99.6	59.9	8187	93.5
2003	6158.2	730	90.0	66.2	90.0	65.0	96.3	61.1	7914	90.3
2004	5346.1	730	81.1	66.7	81.1	65.6	83.4	61.8	7164	81.6
2005	6645.8	767	96.4	67.7	96.4	66.6	98.9	63.0	8443	96.4
2006	5917.1	778	85.6	68.2	85.6	67.2	86.8	63.8	7498	85.6
2007	5826.0	778	84.8	68.8	84.8	67.7	85.5	64.4	7427	84.8
2008	6837.2	778	97.9	69.6	97.9	68.6	100.0	65.5	8599	97.9
2009	6118.7	778	87.9	70.2	87.9	69.2	89.8	66.2	7695	87.8
2010	6240.7	778	90.4	70.7	90.4	69.8	91.6	66.9	7915	90.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		208			1519	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling	634			1105		
D. Inspection, maintenance or repair without refuelling				147		
E. Testing of plant systems or components				1		
F. Major back-fitting, refurbishment or upgrading activities with refuelling					6	
H. Nuclear regulatory requirements					10	90
J. Grid limitation, failure or grid unavailability						6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					23	
P. Fire					0	
Subtotal	634	208	0	1253	1567	96
Total		842			2916	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	208	131
13. Reactor Auxiliary Systems		131
14. Safety Systems		89
15. Reactor Cooling Systems		118
16. Steam generation systems		405
31. Turbine and auxiliaries		98
32. Feedwater and Main Steam System		86
33. Circulating Water System		32
35. All other I&C Systems		0
41. Main Generator Systems		54
42. Electrical Power Supply Systems		238
XX. Miscellaneous Systems		1
Total	208	1383

US-528 PALO VERDE-1

Operator: APS (ARIZONA PUBLIC SERVICE CO.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1311.0 MW(e)
 Design Net Capacity: 1221.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9308.0 GW(e).h
 Energy Availability Factor: 82.4%
 Load Factor: 81.0%
 Operating Factor: 82.4%
 Energy Unavailability Factor: 17.6%
 Total Off-line Time: 1543 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	953.1	898.9	520.1	54.2	178.1	874.8	975.3	969.3	949.4	984.5	958.3	991.9	9308.0
EAF (%)	100.0	100.0	59.4	6.7	28.5	95.2	100.0	100.0	100.0	100.0	100.0	100.0	82.4
UCF (%)	100.0	100.0	59.4	6.7	28.5	95.2	100.0	100.0	100.0	100.0	100.0	100.0	82.4
LF (%)	97.7	102.0	53.3	5.7	18.3	92.7	100.0	99.4	100.6	100.9	101.5	101.7	81.0
OF (%)	100.0	100.0	59.3	6.7	28.4	95.1	100.0	100.0	100.0	100.0	100.0	100.0	82.4
EUF (%)	0.0	0.0	40.6	93.3	71.5	4.8	0.0	0.0	0.0	0.0	0.0	0.0	17.6
PUF (%)	0.0	0.0	0.0	93.3	71.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.7
UCLF (%)	0.0	0.0	40.7	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	3.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/05/1976
 Date of First Criticality: 25/05/1985
 Date of Grid Connection: 06 Oct 1985
 Date of Commercial Operation: 28/01/1986

Lifetime Generation: 208600.6 GW(e).h
 Cumulative Energy Availability Factor: 78.0%
 Cumulative Load Factor: 76.0%
 Cumulative Unit Capability Factor: 78.2%
 Cumulative Energy Unavailability Factor: 22.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	6264.7	1221	66.6	66.6	66.6	66.6	60.5	60.5	5349	63.1
1987	5268.3	1221	50.9	58.6	50.9	58.6	49.3	54.8	4500	51.4
1988	6668.7	1221	62.8	60.0	62.8	60.0	62.2	57.3	5585	63.6
1989	1796.6	1221	14.1	48.5	14.1	48.5	16.8	47.1	1522	17.4
1990	4719.5	1221	42.6	47.3	42.6	47.3	44.1	46.5	3925	44.8
1991	9312.1	1221	87.1	54.0	85.8	53.7	87.1	53.3	7567	86.4
1992	7118.8	1221	67.2	55.9	67.2	55.7	66.4	55.2	6010	68.4
1993	7514.8	1221	76.1	58.4	76.1	58.2	70.3	57.1	6665	76.1
1994	9772.5	1221	98.8	62.9	98.8	62.7	91.4	60.9	8656	98.8
1995	8526.8	1224	82.1	64.8	82.1	64.7	79.5	62.8	7244	82.7
1996	8713.0	1227	84.4	66.6	82.0	66.3	80.8	64.4	7246	82.5
1997	10737.7	1244	98.8	69.3	98.8	69.0	98.5	67.3	8658	98.8
1998	9575.0	1243	89.0	70.9	89.0	70.6	87.9	68.9	7819	89.3
1999	9653.9	1243	88.8	72.2	88.8	71.9	88.7	70.4	7774	88.7
2000	10966.6	1243	99.8	74.1	99.8	73.8	100.4	72.4	8770	99.8
2001	9559.6	1243	88.0	74.9	88.0	74.7	87.8	73.4	7712	88.0
2002	9705.0	1243	90.1	75.8	90.1	75.6	89.1	74.3	7890	90.1
2003	10587.1	1243	98.2	77.1	98.2	76.9	97.2	75.6	8604	98.2
2004	9235.8	1243	88.5	77.7	87.3	77.5	84.6	76.1	7669	87.3
2005	7212.3	1243	70.7	77.4	70.7	77.1	66.2	75.6	6194	70.7
2006	4868.2	1314	60.4	76.5	60.4	76.3	42.3	73.9	5292	60.4
2007	8844.9	1311	78.0	76.6	78.0	76.4	77.0	74.0	6834	78.0
2008	9953.1	1311	86.7	77.0	86.7	76.8	86.4	74.6	7616	86.7
2009	11589.7	1311	99.4	78.0	99.4	77.8	100.9	75.8	8707	99.4
2010	9308.0	1311	82.4	78.2	82.4	78.0	81.0	76.0	7217	82.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		336			520	
B. Refuelling without a maintenance					7	
C. Inspection, maintenance or repair combined with refuelling	1204			1112		
D. Inspection, maintenance or repair without refuelling				182		
E. Testing of plant systems or components				3	10	
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					21	10
Subtotal	1204	336	0	1297	558	15
Total		1540			1870	

7. Equipment Related Full Outages, Analysis by System

System	2010	1985 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		91
13. Reactor Auxiliary Systems		4
14. Safety Systems		17
15. Reactor Cooling Systems		71
16. Steam generation systems		46
31. Turbine and auxiliaries		5
32. Feedwater and Main Steam System		118
33. Circulating Water System		3
35. All other I&C Systems		2
41. Main Generator Systems		10
42. Electrical Power Supply Systems	336	66
XX. Miscellaneous Systems		1
Total	336	434

US-529 PALO VERDE-2

Operator: APS (ARIZONA PUBLIC SERVICE CO.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1314.0 MW(e)
 Design Net Capacity: 1304.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11653.0 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 101.2%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	993.9	896.4	995.9	963.9	992.1	956.7	979.8	979.9	953.8	986.6	959.7	994.5	11653.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	101.7	101.5	101.9	101.9	101.5	101.1	100.2	100.2	100.8	100.9	101.4	101.7	101.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1976
 Date of First Criticality: 18/04/1986
 Date of Grid Connection: 20/05/1986
 Date of Commercial Operation: 19/09/1986
 Lifetime Generation: 216041.9 GW(e).h
 Cumulative Energy Availability Factor: 81.1%
 Cumulative Load Factor: 80.7%
 Cumulative Unit Capability Factor: 81.2%
 Cumulative Energy Unavailability Factor: 18.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986			Data not provided							
1987	8190.0	1221	77.6	77.6	77.6	77.6	76.6	76.6	6860	78.3
1988	6747.2	1221	62.6	70.1	62.6	70.1	62.9	69.7	5613	63.9
1989	4698.8	1221	44.3	61.5	44.3	61.5	43.9	61.1	4003	45.7
1990	6242.2	1221	58.6	60.8	58.6	60.8	58.4	60.4	5276	60.2
1991	8265.2	1221	76.3	63.9	76.3	63.9	77.3	63.8	6690	76.4
1992	10104.5	1221	94.9	69.0	94.9	69.0	94.2	68.9	8341	95.0
1993	5125.3	1221	50.9	66.5	50.9	66.5	47.9	65.9	4621	52.8
1994	6573.9	1221	66.8	66.5	66.8	66.5	61.5	65.3	5919	67.6
1995	9070.9	1224	84.2	68.5	84.2	68.5	84.6	67.5	7420	84.7
1996	9346.1	1227	85.5	70.2	85.5	70.2	86.7	69.4	7548	85.9
1997	9322.7	1244	87.2	71.8	87.2	71.8	85.5	70.9	7661	87.4
1998	11084.8	1243	100.0	74.1	100.0	74.1	101.8	73.5	8760	100.0
1999	9797.3	1243	89.7	75.4	89.7	75.4	90.0	74.8	7857	89.7
2000	9525.3	1243	88.2	76.3	88.2	76.3	87.2	75.7	7743	88.1
2001	10083.5	1243	91.4	77.3	91.4	77.3	92.6	76.8	8002	91.3
2002	10019.2	1243	91.1	78.2	91.1	78.2	92.0	77.8	7981	91.1
2003	8444.4	1243	77.7	78.1	77.7	78.1	77.6	77.8	6809	77.7
2004	10662.1	1335	94.9	79.1	92.6	79.0	92.0	78.6	8138	92.6
2005	9427.2	1335	83.2	79.4	83.2	79.2	80.6	78.7	7284	83.2
2006	9808.2	1314	86.0	79.7	86.0	79.6	85.2	79.1	7535	86.0
2007	10957.6	1314	95.7	80.5	95.7	80.4	95.2	79.9	8384	95.7
2008	8624.1	1314	74.9	80.3	74.9	80.1	74.7	79.6	6577	74.9
2009	9521.6	1314	82.8	80.4	82.8	80.3	82.7	79.8	7254	82.8
2010	11653.0	1314	100.0	81.2	100.0	81.1	101.2	80.7	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1987 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					178	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling				1062		
D. Inspection, maintenance or repair without refuelling				230		
E. Testing of plant systems or components				0		
J. Grid limitation, failure or grid unavailability						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				109	37	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						3
Subtotal	0	0	0	1401	226	8
Total		0			1635	

7. Equipment Related Full Outages, Analysis by System

System	2010	1987 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		6
14. Safety Systems		21
15. Reactor Cooling Systems		9
16. Steam generation systems		30
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		5
35. All other I&C Systems		1
41. Main Generator Systems		5
42. Electrical Power Supply Systems		14
Total	0	131

US-530 PALO VERDE-3

Operator: APS (ARIZONA PUBLIC SERVICE CO.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1317.0 MW(e)
 Design Net Capacity: 1304.0 MW(e)
 Design Discharge Burnup: 38000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10239.0 GW(e).h
 Energy Availability Factor: 89.1%
 Load Factor: 88.7%
 Operating Factor: 89.1%
 Energy Unavailability Factor: 10.9%
 Total Off-line Time: 959 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	987.9	892.9	987.7	954.5	985.7	950.7	976.9	975.8	947.4	23.0	565.0	991.4	10239.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	67.0	100.0	89.1
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	67.0	100.0	89.1
LF (%)	100.8	100.9	100.8	100.7	100.6	100.3	99.7	99.6	99.9	2.4	59.6	101.2	88.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	66.8	100.0	89.1
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	33.0	0.0	10.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	33.0	0.0	10.9
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Jan 1976
 Date of First Criticality: 25/10/1987
 Date of Grid Connection: 28/11/1987
 Date of Commercial Operation: 01 Aug 1988

Lifetime Generation: 207255.6 GW(e).h
 Cumulative Energy Availability Factor: 83.2%
 Cumulative Load Factor: 82.5%
 Cumulative Unit Capability Factor: 83.5%
 Cumulative Energy Unavailability Factor: 16.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	10035.5	1221	94.9	94.9	94.9	94.9	95.4	95.4	8177	94.9
1989	1328.0	1221	9.0	51.6	9.0	51.6	12.4	53.6	1096	12.5
1990	9636.0	1221	91.6	65.0	91.6	65.0	90.1	65.8	8048	91.9
1991	7518.5	1221	75.3	67.6	70.8	66.5	70.3	66.9	6272	71.6
1992	8386.2	1221	78.7	69.8	78.7	68.9	78.2	69.2	6923	78.8
1993	9393.9	1221	90.1	73.2	90.1	72.5	87.8	72.3	7898	90.2
1994	6824.5	1221	66.4	72.2	66.4	71.6	63.8	71.1	5920	67.6
1995	9386.8	1225	86.6	74.0	86.6	73.5	87.4	73.1	7628	87.1
1996	10789.6	1230	99.5	76.9	99.0	76.3	99.9	76.1	8699	99.0
1997	9456.1	1247	89.1	78.1	89.1	77.6	86.5	77.2	7820	89.3
1998	9600.9	1247	89.3	79.2	89.3	78.7	87.9	78.2	7835	89.4
1999	10956.5	1247	100.0	80.9	100.0	80.5	100.3	80.1	8760	100.0
2000	9888.7	1247	89.9	81.6	89.9	81.3	90.3	80.9	7898	89.9
2001	9170.4	1247	85.0	81.9	85.0	81.5	83.9	81.1	7439	84.9
2002	11137.7	1247	100.0	83.1	100.0	82.8	102.0	82.5	8760	100.0
2003	9554.7	1247	88.0	83.4	88.0	83.1	87.5	82.8	7712	88.0
2004	8223.3	1247	78.4	83.1	76.6	82.7	75.1	82.3	6729	76.6
2005	9164.0	1247	85.3	83.2	85.3	82.9	83.9	82.4	7471	85.3
2006	9335.8	1247	87.1	83.4	87.1	83.1	85.5	82.6	7625	87.0
2007	6993.7	1247	67.4	82.6	67.4	82.3	64.0	81.7	5903	67.4
2008	10673.3	1317	93.3	83.2	93.3	82.9	92.3	82.2	8197	93.3
2009	9562.6	1317	83.5	83.2	83.5	82.9	82.9	82.2	7310	83.4
2010	10239.0	1317	89.1	83.5	89.1	83.2	88.7	82.5	7801	89.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					153	
B. Refuelling without a maintenance					2	
C. Inspection, maintenance or repair combined with refuelling	957			1077		
D. Inspection, maintenance or repair without refuelling				117	8	
E. Testing of plant systems or components	0			5		
H. Nuclear regulatory requirements					2	
J. Grid limitation, failure or grid unavailability						7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					20	17
Subtotal	957	0	0	1199	185	24
Total		957			1408	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		5
14. Safety Systems		25
16. Steam generation systems		3
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		34
32. Feedwater and Main Steam System		6
41. Main Generator Systems		9
42. Electrical Power Supply Systems		29
Total	0	120

US-277 PEACH BOTTOM-2

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1122.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 48000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9000.1 GW(e).h
 Energy Availability Factor: 93.0%
 Load Factor: 91.6%
 Operating Factor: 92.9%
 Energy Unavailability Factor: 7.0%
 Total Off-line Time: 621 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	827.0	741.0	847.3	822.4	817.0	807.6	819.6	771.1	265.2	598.7	828.3	854.9	9000.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.2	78.2	100.0	100.0	93.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.2	78.2	100.0	100.0	93.0
LF (%)	99.1	98.3	101.6	101.8	97.9	100.0	98.2	92.4	32.8	71.7	102.4	102.4	91.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	39.4	75.1	100.0	100.0	92.9
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.8	21.8	0.0	0.0	7.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	62.8	21.8	0.0	0.0	7.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 31/01/1968
 Date of First Criticality: 16/09/1973
 Date of Grid Connection: 18/02/1974
 Date of Commercial Operation: 07 May 1974
 Lifetime Generation: 250142.3 GW(e).h
 Cumulative Energy Availability Factor: 74.8%
 Cumulative Load Factor: 72.4%
 Cumulative Unit Capability Factor: 74.8%
 Cumulative Energy Unavailability Factor: 25.2%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	3659.4	1053	90.5	90.5	90.5	90.5	78.9	78.9	4000	90.6
1975	5082.5	1051	55.3	67.1	55.3	67.1	55.2	63.1	6638	75.8
1976	5580.4	1051	60.5	64.4	60.5	64.4	60.4	62.1	5998	68.3
1977	4051.6	1051	44.0	58.6	44.0	58.6	44.0	56.9	4836	55.2
1978	6793.6	1051	73.8	62.0	73.8	62.0	73.8	60.7	7299	83.3
1979	8574.4	1051	92.9	67.6	92.9	67.6	93.1	66.6	8295	94.7
1980	4372.6	1051	49.9	64.9	49.9	64.9	47.4	63.6	4529	51.6
1981	6635.3	1051	78.5	66.7	78.5	66.7	72.1	64.7	6938	79.2
1982	4816.8	1051	56.5	65.5	56.5	65.5	52.3	63.3	5089	58.1
1983	4481.1	1051	49.6	63.8	49.0	63.8	48.7	61.7	4461	50.9
1984	2465.8	1051	28.9	60.5	28.9	60.4	26.7	58.4	2544	29.0
1985	2378.2	1051	28.7	57.7	28.7	57.7	25.8	55.6	2570	29.3
1986	6896.6	1051	79.8	59.5	79.8	59.4	74.9	57.1	7010	80.0
1987	1599.9	1051	16.5	56.3	16.5	56.3	17.4	54.2	1724	19.7
1988	0.0	1051	0.0	52.4	0.0	52.4	0.0	50.4	0	0.0
1989	3880.9	1051	52.3	52.4	52.3	52.4	42.2	49.9	4735	54.1
1990	6699.8	1055	78.9	54.0	78.9	54.0	72.5	51.3	6977	79.6
1991	5121.0	1055	58.8	54.3	58.8	54.3	55.4	51.5	5277	60.2
1992	5677.9	1055	64.9	54.9	64.9	54.8	61.3	52.0	5811	66.2
1993	7704.1	1053	85.9	56.5	85.9	56.4	83.5	53.6	7571	86.4
1994	7450.7	1055	88.8	58.0	88.8	58.0	80.6	55.0	7783	88.8
1995	9363.4	1093	98.2	60.0	98.2	60.0	97.8	57.0	8598	98.2
1996	7660.6	1093	93.1	61.5	93.1	61.5	79.8	58.1	8176	93.1
1997	9570.3	1093	98.9	63.1	98.9	63.1	100.0	59.9	8663	98.9
1998	7658.8	1093	90.4	64.3	90.4	64.3	80.0	60.8	7923	90.4
1999	9462.3	1093	98.6	65.7	98.6	65.7	98.8	62.3	8635	98.6
2000	8523.0	1093	93.0	66.7	93.0	66.7	88.8	63.3	8169	93.0
2001	9369.2	1093	97.8	67.9	97.8	67.9	97.9	64.6	8563	97.8
2002	8838.9	1093	93.0	68.8	93.0	68.8	92.3	65.6	8149	93.0
2003	9265.8	1112	96.3	69.8	96.3	69.8	94.9	66.7	8430	96.2
2004	8886.1	1112	91.8	70.5	91.8	70.5	91.0	67.5	8066	91.8
2005	9615.1	1112	97.8	71.4	97.8	71.4	98.7	68.5	8569	97.8
2006	9088.3	1112	93.3	72.1	93.3	72.1	93.3	69.3	8172	93.3
2007	9867.9	1112	100.0	73.0	100.0	73.0	101.6	70.3	8737	100.0
2008	8750.0	1112	90.1	73.5	90.1	73.5	89.6	70.9	7914	90.1
2009	9941.7	1112	100.0	74.3	100.0	74.3	102.1	71.8	8760	100.0
2010	9000.1	1122	93.0	74.8	93.0	74.8	91.6	72.4	8139	92.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					387	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling	620			1229		
D. Inspection, maintenance or repair without refuelling				216	0	
E. Testing of plant systems or components				5	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements				109	40	12
J. Grid limitation, failure or grid unavailability					5	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				31	6	1
L. Human factor related					0	
Subtotal	620	0	0	1590	443	13
Total		620			2046	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		21
13. Reactor Auxiliary Systems		15
14. Safety Systems		43
15. Reactor Cooling Systems		100
31. Turbine and auxiliaries		48
32. Feedwater and Main Steam System		29
35. All other I&C Systems		1
41. Main Generator Systems		6
42. Electrical Power Supply Systems		50
XX. Miscellaneous Systems		5
Total	0	318

US-278 PEACH BOTTOM-3

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1112.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 48000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9759.3 GW(e).h
 Energy Availability Factor: 98.6%
 Load Factor: 100.2%
 Operating Factor: 98.6%
 Energy Unavailability Factor: 1.4%
 Total Off-line Time: 120 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	842.8	769.9	846.5	821.5	841.6	813.7	830.5	828.6	811.1	845.8	658.1	849.0	9759.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.5	100.0	98.6
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.5	100.0	98.6
LF (%)	101.9	103.0	102.5	102.6	101.7	101.6	100.4	100.2	101.3	102.2	82.1	102.6	100.2
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.4	100.0	98.6
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.5	0.0	1.4
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.5	0.0	1.4
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 31/01/1968
 Date of First Criticality: 08 Jul 1974
 Date of Grid Connection: 09 Jan 1974
 Date of Commercial Operation: 23/12/1974
 Lifetime Generation: 248354.2 GW(e).h
 Cumulative Energy Availability Factor: 75.2%
 Cumulative Load Factor: 73.6%
 Cumulative Unit Capability Factor: 75.3%
 Cumulative Energy Unavailability Factor: 24.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	396.1	1073	74.9	74.9	74.9	74.9	51.4	51.4	558	75.0
1975	5282.4	1035	58.2	58.2	58.2	59.5	58.3	57.7	7520	85.8
1976	6056.8	1035	66.7	62.9	66.7	62.9	66.6	62.0	6829	77.7
1977	4787.8	1035	52.8	59.7	52.8	59.7	52.8	59.0	5450	62.2
1978	6973.6	1035	76.9	63.9	76.9	63.9	76.9	63.4	7412	84.6
1979	6110.4	1035	67.2	64.5	67.2	64.5	67.4	64.2	6500	74.2
1980	7233.4	1035	80.1	67.1	79.7	67.0	79.6	66.7	7089	80.7
1981	3171.1	1035	33.0	62.3	33.0	62.2	35.0	62.2	3201	36.5
1982	8532.3	1035	95.3	66.4	95.3	66.3	94.1	66.2	8372	95.6
1983	2465.7	1035	27.5	62.1	27.1	62.0	27.2	61.9	2714	31.0
1984	7445.5	1035	86.2	64.5	85.2	64.3	81.9	63.9	7545	85.9
1985	3320.8	1035	45.1	62.8	45.1	62.6	36.6	61.4	3988	45.5
1986	4858.8	1035	60.9	62.6	60.9	62.5	53.6	60.8	5542	63.3
1987	1507.7	1035	14.4	58.9	14.4	58.8	16.6	57.4	1658	18.9
1988	0.0	1035	0.0	54.7	0.0	54.6	0.0	53.3	0	0.0
1989	247.3	1035	0.1	51.1	0.1	51.0	2.7	50.0	472	5.4
1990	7534.1	1035	87.1	53.3	87.1	53.2	83.1	52.0	7684	87.7
1991	5118.9	1035	59.1	53.7	57.3	53.5	56.5	52.3	5212	59.5
1992	7180.9	1035	83.6	55.3	83.6	55.1	79.0	53.8	7391	84.1
1993	6314.0	1035	73.9	56.3	73.9	56.1	69.6	54.6	6594	75.3
1994	8867.4	1035	97.9	58.4	97.9	58.2	97.8	56.7	8588	98.0
1995	7172.5	1049	90.1	59.9	90.1	59.7	78.0	57.8	7929	90.5
1996	9424.7	1093	98.2	61.7	98.2	61.6	98.2	59.7	8627	98.2
1997	7566.6	1093	90.3	63.0	90.3	62.9	79.0	60.6	7909	90.3
1998	8823.6	1093	93.3	64.4	93.3	64.2	92.2	61.9	8172	93.3
1999	8558.6	1093	92.5	65.5	92.5	65.4	89.4	63.1	8100	92.5
2000	9556.8	1093	99.3	66.9	99.3	66.7	99.5	64.6	8722	99.3
2001	8524.4	1093	93.1	67.9	93.1	67.8	89.0	65.5	8153	93.1
2002	9647.4	1093	99.8	69.1	99.8	68.9	100.8	66.8	8740	99.8
2003	8937.8	1112	92.4	69.9	92.4	69.8	92.9	67.7	8089	92.3
2004	9989.1	1112	100.0	71.0	100.0	70.8	102.3	69.0	8784	100.0
2005	8848.9	1112	92.5	71.7	92.5	71.6	90.8	69.7	8105	92.5
2006	9912.7	1112	100.0	72.6	100.0	72.5	101.8	70.7	8760	100.0
2007	9030.8	1112	93.7	73.3	93.7	73.2	92.7	71.4	8207	93.7
2008	9830.5	1112	99.4	74.1	99.4	74.0	100.6	72.3	8729	99.4
2009	8668.1	1112	90.1	74.6	90.1	74.5	89.0	72.8	7888	90.0
2010	9759.3	1112	98.6	75.3	98.6	75.2	100.2	73.6	8640	98.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		119		7	336	4
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling				1284		
D. Inspection, maintenance or repair without refuelling				87		
E. Testing of plant systems or components				15	1	
H. Nuclear regulatory requirements					178	6
J. Grid limitation, failure or grid unavailability					10	2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				22	0	3
Subtotal	0	119	0	1415	541	15
Total		119			1971	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		12
14. Safety Systems		41
15. Reactor Cooling Systems		102
31. Turbine and auxiliaries		44
32. Feedwater and Main Steam System		42
33. Circulating Water System		2
41. Main Generator Systems		18
42. Electrical Power Supply Systems	119	53
Total	119	338

US-440 PERRY-1

Operator: FENOC (FIRST ENERGY NUCLEAR OPERATING CO.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1240.0 MW(e)
 Design Net Capacity: 1205.0 MW(e)
 Design Discharge Burnup: 7614 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10619.7 GW(e).h
 Energy Availability Factor: 98.1%
 Load Factor: 97.8%
 Operating Factor: 98.1%
 Energy Unavailability Factor: 1.9%
 Total Off-line Time: 170 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	948.8	844.4	929.7	890.4	680.4	827.9	903.2	921.5	899.6	924.2	910.8	938.8	10619.7
EAF (%)	100.0	100.0	100.0	100.0	77.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1
UCF (%)	100.0	100.0	100.0	100.0	77.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1
LF (%)	102.8	101.3	100.9	99.7	73.8	92.7	97.9	99.9	100.8	100.2	101.9	101.8	97.8
OF (%)	100.0	100.0	100.0	100.0	77.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1
EUUF (%)	0.0	0.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 10 Jan 1974
 Date of First Criticality: 06 Jun 1986
 Date of Grid Connection: 19/12/1986
 Date of Commercial Operation: 18/11/1987
 Lifetime Generation: 189477.5 GW(e).h
 Cumulative Energy Availability Factor: 80.6%
 Cumulative Load Factor: 78.5%
 Cumulative Unit Capability Factor: 80.6%
 Cumulative Energy Unavailability Factor: 19.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987			Data not provided							
1988	7233.8	1203	76.3	76.3	76.3	76.3	68.4	68.4	6664	75.9
1989	5357.6	1141	53.4	65.2	53.4	65.2	53.6	61.2	4776	54.5
1990	6638.9	1141	65.3	65.2	65.3	65.2	66.4	62.9	5723	65.3
1991	8975.7	1166	90.7	71.6	90.7	71.6	87.9	69.2	7949	90.7
1992	7168.6	1166	72.6	71.8	72.6	71.8	70.0	69.3	6383	72.7
1993	3973.2	1166	43.9	67.2	43.9	67.2	38.9	64.3	3853	44.0
1994	4591.9	1166	47.3	64.3	47.3	64.3	45.0	61.5	4151	47.4
1995	9112.1	1166	93.4	67.9	93.4	67.9	89.2	65.0	8174	93.3
1996	7482.0	1164	75.9	68.8	75.9	68.8	73.2	65.9	6673	76.0
1997	8151.8	1160	81.9	70.1	81.9	70.1	80.2	67.3	7178	81.9
1998	10188.9	1160	99.1	72.8	99.1	72.8	100.3	70.3	8684	99.1
1999	9124.9	1160	89.6	74.2	89.6	74.2	89.8	71.9	7850	89.6
2000	10085.7	1191	96.9	76.0	96.9	76.0	96.4	73.8	8506	96.8
2001	7781.8	1241	77.9	76.1	77.9	76.1	71.8	73.7	6708	76.6
2002	9974.8	1235	93.6	77.3	93.6	77.3	92.2	75.0	8196	93.6
2003	8553.2	1235	82.4	77.7	82.4	77.7	79.1	75.3	7217	82.4
2004	10227.3	1235	95.4	78.7	95.4	78.7	94.3	76.4	8378	95.4
2005	7667.5	1235	72.7	78.4	72.7	78.4	70.9	76.1	6363	72.6
2006	10475.4	1235	97.3	79.4	97.3	79.4	96.8	77.2	8521	97.3
2007	8058.2	1245	76.8	79.3	76.8	79.3	73.9	77.1	6704	76.5
2008	10680.6	1245	97.7	80.2	97.7	80.2	97.7	78.1	8580	97.7
2009	7345.1	1245	71.8	79.8	71.8	79.8	67.3	77.6	6284	71.7
2010	10619.7	1240	98.1	80.6	98.1	80.6	97.8	78.5	8590	98.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		169			456	
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling				1034		
D. Inspection, maintenance or repair without refuelling				185		
E. Testing of plant systems or components				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					7	
Z. Others					7	
Subtotal	0	169	0	1219	486	0
Total		169			1705	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		4
12. Reactor I&C Systems	169	37
13. Reactor Auxiliary Systems		15
14. Safety Systems		0
15. Reactor Cooling Systems		71
31. Turbine and auxiliaries		56
32. Feedwater and Main Steam System		12
33. Circulating Water System		10
35. All other I&C Systems		26
41. Main Generator Systems		30
42. Electrical Power Supply Systems		53
XX. Miscellaneous Systems		113
Total	169	427

US-293 PILGRIM-1

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 685.0 MW(e)
 Design Net Capacity: 655.0 MW(e)
 Design Discharge Burnup: 25000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5917.8 GW(e).h
 Energy Availability Factor: 100.0%
 Load Factor: 98.6%
 Operating Factor: 100.0%
 Energy Unavailability Factor: 0.0%
 Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	509.5	460.2	505.1	492.1	496.1	489.4	496.4	497.4	485.5	497.6	485.5	502.9	5917.8
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	100.0	100.0	99.3	99.8	97.4	99.2	97.4	97.6	98.4	97.6	98.3	98.7	98.6
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 26/08/1968
 Date of First Criticality: 16/06/1972
 Date of Grid Connection: 19/07/1972
 Date of Commercial Operation: 12 Jan 1972
 Lifetime Generation: 151804.4 GW(e).h
 Cumulative Energy Availability Factor: 71.4%
 Cumulative Load Factor: 67.5%
 Cumulative Unit Capability Factor: 71.6%
 Cumulative Energy Unavailability Factor: 28.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	304.5	678	100.0	100.0	100.0	100.0	59.6	59.6	511	68.7
1973	4074.2	655	88.1	89.1	88.1	89.1	71.0	70.1	7574	86.5
1974	1973.1	670	39.2	64.9	39.2	64.9	33.6	52.4	3435	39.2
1975	2587.3	668	44.1	58.1	44.1	58.1	44.2	49.7	6239	71.2
1976	2415.5	665	41.1	54.0	41.1	54.0	41.4	47.7	5330	60.7
1977	2652.2	670	45.2	52.2	45.2	52.2	45.2	47.2	5379	61.4
1978	4376.7	669	74.8	55.9	74.8	55.9	74.7	51.7	7276	83.1
1979	4844.6	670	82.5	59.7	82.5	59.7	82.5	56.1	7828	89.4
1980	3044.1	670	56.5	59.3	56.5	59.3	51.7	55.5	4952	56.4
1981	3444.1	670	66.0	60.0	66.0	60.0	58.7	55.9	5767	65.8
1982	3287.1	670	64.1	60.4	64.1	60.4	56.0	55.9	5597	63.9
1983	4711.9	670	87.3	62.9	87.3	62.9	80.3	58.1	7640	87.2
1984	3.5	669	1.4	57.8	1.4	57.8	0.1	53.3	34	0.4
1985	4951.0	667	93.3	60.5	91.5	60.3	84.6	55.7	8013	91.5
1986	1027.5	670	18.9	57.5	18.9	57.4	17.5	53.0	1646	18.8
1987	0.0	670	0.0	53.7	0.0	53.6	0.0	49.4	0	0.0
1988	0.0	670	0.0	50.3	0.0	50.2	0.0	46.4	0	0.0
1989	1707.8	670	56.3	50.7	56.3	50.6	29.1	45.3	4919	56.2
1990	4243.2	670	77.5	52.2	77.5	52.1	72.3	46.8	6784	77.4
1991	3424.5	670	69.9	53.1	63.7	52.7	58.3	47.4	5572	63.6
1992	4742.0	670	84.3	54.7	84.3	54.3	80.6	49.1	7400	84.2
1993	4340.8	670	79.1	55.8	78.6	55.4	74.0	50.3	6880	78.5
1994	3824.1	670	69.4	56.4	69.4	56.1	65.2	51.0	6069	69.3
1995	4485.8	670	79.5	57.4	79.5	57.1	76.4	52.1	6962	79.5
1996	5324.3	670	95.0	59.0	95.0	58.7	90.5	53.7	8345	95.0
1997	4310.4	670	78.1	59.8	78.1	59.4	73.4	54.4	6840	78.1
1998	5698.4	670	100.0	61.3	100.0	61.0	97.1	56.1	8760	100.0
1999	4473.3	670	81.6	62.1	81.6	61.7	76.2	56.8	7141	81.5
2000	5512.3	670	96.3	63.3	96.3	63.0	93.7	58.1	8454	96.2
2001	5144.0	653	90.0	64.2	90.0	63.9	89.0	59.2	7884	90.0
2002	5769.1	653	100.0	65.3	100.0	65.1	100.9	60.5	8760	100.0
2003	4977.2	684	85.8	66.0	85.8	65.7	84.7	61.3	7548	86.2
2004	5939.3	684	99.3	67.1	99.3	66.8	98.9	62.5	8721	99.3
2005	5474.0	685	93.2	67.9	93.2	67.6	91.2	63.4	8166	93.2
2006	5829.2	685	99.1	68.8	99.1	68.6	97.1	64.4	8684	99.1
2007	5119.8	685	88.8	69.4	88.8	69.2	85.3	65.0	7774	88.7
2008	5869.0	685	99.5	70.3	98.6	70.0	97.5	65.9	8656	98.5
2009	5396.0	684	91.5	70.8	91.5	70.6	90.1	66.6	8012	91.5
2010	5917.8	685	100.0	71.6	100.0	71.4	98.6	67.5	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				1	549	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling				1318	2	
D. Inspection, maintenance or repair without refuelling				141	0	
E. Testing of plant systems or components				50	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling					0	
H. Nuclear regulatory requirements				38	4	137
J. Grid limitation, failure or grid unavailability						19
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					49	5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	0	0	0	1548	616	163
Total		0			2327	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		5
12. Reactor I&C Systems		30
13. Reactor Auxiliary Systems		99
14. Safety Systems		11
15. Reactor Cooling Systems		137
31. Turbine and auxiliaries		57
32. Feedwater and Main Steam System		50
35. All other I&C Systems		2
41. Main Generator Systems		41
42. Electrical Power Supply Systems		56
XX. Miscellaneous Systems		10
Total	0	498

US-266 POINT BEACH-1

Operator: NEXTERA (NextEra Energy Resources, LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 512.0 MW(e)
Design Net Capacity: 497.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 3956.1 GW(e).h
Energy Availability Factor: 89.9%
Load Factor: 88.2%
Operating Factor: 89.8%
Energy Unavailability Factor: 10.1%
Total Off-line Time: 890 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	381.5	342.5	0.0	315.6	383.2	324.2	336.7	366.4	369.7	379.8	373.2	383.3	3956.1
EAF (%)	100.0	100.0	0.3	89.1	100.0	100.0	91.2	100.0	100.0	100.0	100.0	100.0	89.9
UCF (%)	100.0	100.0	0.3	89.1	100.0	100.0	91.2	100.0	100.0	100.0	100.0	100.0	89.9
LF (%)	100.1	99.5	0.0	85.6	100.6	88.0	88.4	96.2	100.3	99.7	101.1	100.6	88.2
OF (%)	100.0	100.0	0.0	88.8	100.0	100.0	91.1	100.0	100.0	100.0	100.0	100.0	89.8
EUF (%)	0.0	0.0	99.7	10.9	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	10.1
PUF (%)	0.0	0.0	99.7	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 19/07/1967
Date of First Criticality: 11 Feb 1970
Date of Grid Connection: 11 Jun 1970
Date of Commercial Operation: 21/12/1970

Lifetime Generation: 137933.8 GW(e).h
Cumulative Energy Availability Factor: 83.3%
Cumulative Load Factor: 79.0%
Cumulative Unit Capability Factor: 83.7%
Cumulative Energy Unavailability Factor: 16.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1970			Data not provided							
1971	3446.2	524	100.0	100.0	100.0	100.0	75.1	75.1	7699	87.9
1972	3085.5	524	100.0	100.0	100.0	100.0	67.0	71.1	6349	72.3
1973	2742.3	497	67.6	89.6	67.6	89.6	63.0	68.5	6867	78.4
1974	3144.3	497	81.4	87.6	81.4	87.6	72.2	69.4	7136	81.5
1975	2924.9	480	69.5	84.2	69.5	84.2	69.6	69.4	6297	71.9
1976	3392.5	492	78.4	83.2	78.4	83.2	78.5	70.9	7239	82.4
1977	3687.1	495	85.1	83.5	85.1	83.5	85.0	72.9	7733	88.3
1978	3794.5	495	87.5	84.0	87.5	84.0	87.5	74.7	7864	89.8
1979	3059.6	495	70.6	82.5	70.6	82.5	70.6	74.2	6455	73.7
1980	2479.3	495	91.0	83.4	77.0	82.0	57.0	72.5	6739	76.7
1981	2614.9	495	78.3	82.9	78.3	81.6	60.3	71.4	6834	78.0
1982	2701.7	495	81.5	82.8	81.5	81.6	62.3	70.7	7134	81.4
1983	2384.9	495	74.3	82.1	74.3	81.1	55.0	69.5	6498	74.2
1984	3109.2	485	72.6	81.5	72.6	80.5	73.0	69.7	6379	72.6
1985	3354.2	485	78.6	81.3	78.6	80.4	78.9	70.3	6917	79.0
1986	3770.1	485	88.7	81.7	88.7	80.9	88.7	71.4	7786	88.9
1987	3567.1	485	83.6	81.9	83.6	81.0	84.0	72.2	7348	83.9
1988	3831.0	485	88.5	82.2	88.5	81.4	89.9	73.1	7787	88.6
1989	3606.2	485	87.8	82.5	87.8	81.8	84.9	73.7	7706	88.0
1990	3531.7	485	83.8	82.6	83.8	81.9	83.1	74.2	7362	84.0
1991	3628.7	485	85.7	82.7	85.7	82.0	85.4	74.7	7524	85.9
1992	3605.6	485	84.1	82.8	84.1	82.1	84.6	75.2	7409	84.3
1993	3804.8	485	88.8	83.0	88.8	82.4	89.6	75.8	7799	89.0
1994	3905.1	485	92.0	83.4	92.0	82.8	91.9	76.4	8071	92.1
1995	3792.4	485	88.5	83.6	88.5	83.0	89.3	77.0	7768	88.7
1996	4003.3	485	93.0	84.0	93.0	83.4	94.0	77.6	8173	93.0
1997	853.5	485	21.3	81.7	21.3	81.1	20.1	75.5	1872	21.4
1998	2584.2	485	62.7	81.0	62.7	80.5	60.8	75.0	5489	62.7
1999	3489.3	489	80.0	81.0	80.0	80.5	81.4	75.2	7070	80.7
2000	4134.6	510	96.1	81.5	95.6	81.0	92.3	75.8	8391	95.5
2001	3702.1	510	87.0	81.7	87.0	81.2	82.9	76.0	7611	86.9
2002	3975.8	510	91.0	82.0	91.0	81.5	89.0	76.5	7964	90.9
2003	4343.0	516	97.5	82.5	97.5	82.0	96.2	77.1	8538	97.5
2004	3631.0	516	81.9	82.5	81.9	82.0	80.1	77.2	7186	81.8
2005	3641.0	512	82.6	82.5	82.6	82.0	81.2	77.3	7232	82.6
2006	4465.6	512	100.0	83.0	100.0	82.6	99.6	77.9	8760	100.0
2007	3822.3	512	86.6	83.1	86.6	82.7	85.2	78.1	7582	86.6
2008	3737.0	512	83.9	83.1	83.9	82.7	83.1	78.3	7365	83.8
2009	4385.4	512	100.0	83.5	100.0	83.2	97.8	78.8	8760	100.0
2010	3956.1	512	89.9	83.7	89.9	83.3	88.2	79.0	7870	89.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		65			144	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling	823			1055		
D. Inspection, maintenance or repair without refuelling				54		
E. Testing of plant systems or components				2		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				1		
H. Nuclear regulatory requirements						31
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	175	1
Subtotal	823	65	0	1112	319	33
Total		888			1464	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		0
15. Reactor Cooling Systems		9
16. Steam generation systems		59
31. Turbine and auxiliaries	65	15
32. Feedwater and Main Steam System		15
33. Circulating Water System		1
41. Main Generator Systems		8
42. Electrical Power Supply Systems		14
Total	65	122

US-301 POINT BEACH-2

Operator: NEXTERA (NextEra Energy Resources, LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 515.0 MW(e)
Design Net Capacity: 497.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4336.3 GW(e).h
Energy Availability Factor: 97.0%
Load Factor: 96.1%
Operating Factor: 97.0%
Energy Unavailability Factor: 3.0%
Total Off-line Time: 265 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	383.5	345.5	382.1	374.0	383.8	309.2	362.5	379.7	373.1	385.1	376.8	281.0	4336.3
EAF (%)	100.0	100.0	100.0	100.0	100.0	94.4	95.6	100.0	100.0	100.0	100.0	74.4	97.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	94.4	95.6	100.0	100.0	100.0	100.0	74.4	97.0
LF (%)	100.1	99.8	99.8	100.9	100.2	83.4	94.6	99.1	100.6	100.5	101.5	73.3	96.1
OF (%)	100.0	100.0	100.0	100.0	100.0	94.3	95.6	100.0	100.0	100.0	100.0	74.3	97.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	5.6	4.4	0.0	0.0	0.0	0.0	25.6	3.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	5.6	4.4	0.0	0.0	0.0	0.0	25.6	3.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/07/1968
Date of First Criticality: 30/05/1972
Date of Grid Connection: 08 Feb 1972
Date of Commercial Operation: 10 Jan 1972
Lifetime Generation: 136925.6 GW(e).h
Cumulative Energy Availability Factor: 84.9%
Cumulative Load Factor: 82.6%
Cumulative Unit Capability Factor: 84.9%
Cumulative Energy Unavailability Factor: 15.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	140.4	288	100.0	100.0	100.0	100.0	84.8	84.8	1799	81.5
1973	2991.0	497	80.2	80.9	80.2	80.9	68.7	69.3	8192	93.5
1974	3179.3	497	81.0	81.0	81.0	81.0	73.0	71.1	7100	81.1
1975	3741.4	485	87.9	83.2	87.9	83.2	88.1	76.6	8224	93.9
1976	3749.2	491	86.8	84.1	86.8	84.1	86.9	79.2	7959	90.6
1977	3622.3	495	83.5	84.0	83.5	84.0	83.5	80.0	7496	85.6
1978	3858.9	495	89.0	84.8	89.0	84.8	89.0	81.5	8039	91.8
1979	3707.5	495	85.5	84.9	85.5	84.9	85.5	82.1	7728	88.2
1980	3587.9	495	88.0	85.3	88.0	85.3	82.5	82.1	7569	86.2
1981	3720.3	495	89.9	85.8	89.9	85.8	85.8	82.5	7757	88.6
1982	3605.4	495	88.2	86.1	88.2	86.1	83.1	82.6	7595	86.7
1983	3016.3	495	74.5	85.0	74.5	85.0	69.6	81.4	6245	71.3
1984	3512.4	495	86.0	85.1	86.0	85.1	80.8	81.4	7405	84.3
1985	3603.1	485	86.8	85.2	86.8	85.2	84.8	81.6	7491	85.5
1986	3417.6	485	82.1	85.0	82.1	85.0	80.4	81.5	7186	82.0
1987	3606.1	485	85.9	85.1	85.5	85.0	84.9	81.8	7478	85.4
1988	3718.7	485	88.0	85.2	88.0	85.2	87.3	82.1	7626	86.8
1989	3485.1	485	82.9	85.1	82.9	85.1	82.0	82.1	7107	81.1
1990	3793.5	485	89.1	85.3	89.1	85.3	89.3	82.5	7713	88.0
1991	3689.2	485	87.6	85.4	87.6	85.4	86.8	82.7	7569	86.4
1992	3668.2	485	86.6	85.5	86.6	85.5	86.1	82.9	7492	85.3
1993	3844.5	485	90.9	85.8	90.9	85.7	90.5	83.2	7883	90.0
1994	3752.3	485	90.3	86.0	90.3	85.9	88.3	83.5	7827	89.3
1995	3386.0	485	83.4	85.9	83.4	85.8	79.7	83.3	7158	81.7
1996	2950.3	485	78.0	85.5	78.0	85.5	69.3	82.7	6653	75.7
1997	825.5	485	21.4	83.0	21.4	83.0	19.4	80.2	1788	20.4
1998	3123.8	485	75.5	82.7	75.5	82.7	73.5	80.0	6609	75.4
1999	3578.5	498	82.6	82.7	82.6	82.7	81.9	80.0	7195	82.1
2000	3527.4	512	80.9	82.6	80.9	82.6	78.4	80.0	7094	80.8
2001	4343.0	512	98.6	83.2	98.6	83.2	96.8	80.6	8631	98.5
2002	4004.3	512	90.7	83.5	90.7	83.4	89.3	80.9	7934	90.6
2003	3713.3	518	85.6	83.5	85.6	83.5	81.9	80.9	7469	85.3
2004	4384.9	518	97.5	84.0	97.5	84.0	96.4	81.4	8559	97.4
2005	3232.6	514	72.6	83.6	72.6	83.6	71.8	81.1	6355	72.5
2006	4094.8	514	91.0	83.9	91.0	83.8	90.9	81.4	7972	91.0
2007	4462.2	514	100.0	84.3	100.0	84.3	99.1	81.9	8760	100.0
2008	4075.9	514	90.0	84.5	90.0	84.5	90.3	82.2	7904	90.0
2009	3782.5	516	85.7	84.5	85.7	84.5	83.7	82.2	7501	85.6
2010	4336.3	515	97.0	84.9	97.0	84.9	96.1	82.6	8495	97.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		32			107	
B. Refuelling without a maintenance					0	
C. Inspection, maintenance or repair combined with refuelling				1093		
D. Inspection, maintenance or repair without refuelling				38	0	
E. Testing of plant systems or components				5		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				2		
H. Nuclear regulatory requirements					4	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	38	0
L. Human factor related		230				
Z. Others					2	
Subtotal	0	262	0	1138	151	0
Total		262			1289	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		3
12. Reactor I&C Systems		29
14. Safety Systems		0
15. Reactor Cooling Systems		33
16. Steam generation systems		15
31. Turbine and auxiliaries		6
32. Feedwater and Main Steam System	32	9
42. Electrical Power Supply Systems		8
Total	32	103

US-282 PRAIRIE ISLAND-1

Operator: NSP (Northern States Power Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 551.0 MW(e)
Design Net Capacity: 530.0 MW(e)
Design Discharge Burnup: 51000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4654.9 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 96.0%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	403.8	364.7	403.2	382.4	390.8	371.0	385.1	385.3	382.0	402.5	373.4	410.6	4654.9
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	98.5	98.5	98.5	96.4	95.3	93.5	93.9	94.0	96.3	96.6	92.5	98.6	96.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/06/1968
Date of First Criticality: 12 Jan 1973
Date of Grid Connection: 12 Apr 1973
Date of Commercial Operation: 16/12/1973

Lifetime Generation: 142688.3 GW(e).h
Cumulative Energy Availability Factor: 86.3%
Cumulative Load Factor: 85.2%
Cumulative Unit Capability Factor: 86.3%
Cumulative Energy Unavailability Factor: 13.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	7.2	514	100.0	100.0	100.0	100.0	2.1	2.1	312	46.4
1974	1452.2	520	43.9	47.9	43.9	47.9	31.9	29.8	3848	43.9
1975	3694.2	520	81.2	63.9	81.2	63.9	81.1	54.5	7560	86.3
1976	3268.7	520	71.5	66.4	71.5	66.4	71.6	60.0	6801	77.4
1977	3714.5	511	82.9	70.4	82.9	70.4	83.0	65.6	7453	85.1
1978	3810.7	507	85.9	73.4	85.9	73.4	85.8	69.5	8012	91.5
1979	2910.9	503	65.8	72.2	65.8	72.2	66.1	68.9	6402	73.1
1980	3105.7	503	77.8	73.0	77.8	73.0	70.3	69.1	6863	78.1
1981	3838.6	503	88.9	74.9	88.9	74.9	87.1	71.3	7803	89.1
1982	3918.0	503	90.9	76.6	90.9	76.6	88.9	73.2	7960	90.9
1983	3888.9	503	87.2	77.7	87.2	77.7	88.3	74.7	7621	87.0
1984	4159.4	503	94.3	79.2	94.3	79.2	94.1	76.4	8285	94.3
1985	3678.5	503	83.4	79.5	83.4	79.5	83.5	77.0	7333	83.7
1986	3819.6	503	89.6	80.3	89.6	80.3	86.7	77.8	7870	89.8
1987	3590.3	503	82.2	80.4	82.2	80.4	81.5	78.0	7232	82.6
1988	3823.4	503	89.3	81.0	89.3	81.0	86.5	78.6	7800	88.8
1989	4392.3	503	99.7	82.2	99.7	82.2	99.7	79.9	8737	99.7
1990	3829.7	503	81.7	82.1	81.7	82.1	86.9	80.3	7764	88.6
1991	3987.1	505	90.5	82.6	90.5	82.6	90.1	80.8	7943	90.7
1992	3497.8	503	77.4	82.3	77.4	82.3	79.2	80.7	6844	77.9
1993	4378.0	505	96.8	83.0	96.8	83.0	98.9	81.6	8480	96.8
1994	3718.2	513	82.8	83.0	82.8	83.0	82.7	81.7	7258	82.9
1995	4519.0	513	99.9	83.8	99.9	83.8	100.6	82.6	8752	99.9
1996	3741.6	513	92.9	84.2	92.2	84.2	83.0	82.6	7327	83.4
1997	3522.8	513	79.5	84.0	79.5	84.0	78.4	82.4	6965	79.5
1998	4209.2	514	90.8	84.3	90.8	84.3	93.5	82.8	7948	90.7
1999	4068.8	522	87.2	84.4	87.2	84.4	89.0	83.1	7643	87.2
2000	4536.5	522	96.7	84.9	96.7	84.8	98.9	83.7	8499	96.8
2001	3641.7	522	78.8	84.6	78.8	84.6	79.6	83.5	6890	78.7
2002	4373.2	522	94.4	85.0	94.4	85.0	95.6	84.0	8268	94.4
2003	4596.3	522	98.4	85.4	98.4	85.4	101.0	84.5	8619	98.4
2004	3602.1	522	79.9	85.3	79.9	85.2	78.6	84.3	7017	79.9
2005	4518.4	522	96.7	85.6	96.7	85.6	98.8	84.8	8465	96.6
2006	4103.2	523	88.9	85.7	88.9	85.7	89.6	85.0	7785	88.9
2007	4457.1	551	96.7	86.1	96.7	86.0	92.3	85.2	8472	96.7
2008	4059.5	551	88.6	86.1	88.6	86.1	83.9	85.1	7780	88.6
2009	3600.2	551	79.0	85.9	79.0	85.9	74.6	84.8	6923	79.0
2010	4654.9	560	100.0	86.3	100.0	86.3	96.0	85.2	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				5	285	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				698		
D. Inspection, maintenance or repair without refuelling				77		
E. Testing of plant systems or components				6	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					24	1
Subtotal	0	0	0	786	310	1
Total		0			1097	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		14
12. Reactor I&C Systems		27
14. Safety Systems		9
15. Reactor Cooling Systems		7
16. Steam generation systems		36
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		118
32. Feedwater and Main Steam System		34
33. Circulating Water System		2
35. All other I&C Systems		8
41. Main Generator Systems		1
42. Electrical Power Supply Systems		8
XX. Miscellaneous Systems		0
Total	0	265

US-306 PRAIRIE ISLAND-2

Operator: NSP (Northern States Power Co.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 545.0 MW(e)
 Design Net Capacity: 530.0 MW(e)
 Design Discharge Burnup: 51000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4128.1 GW(e).h
 Energy Availability Factor: 89.3%
 Load Factor: 86.1%
 Operating Factor: 89.2%
 Energy Unavailability Factor: 10.7%
 Total Off-line Time: 943 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	401.3	364.2	401.9	192.1	49.1	370.9	384.5	385.1	379.5	396.1	395.2	408.1	4128.1
EAF (%)	100.0	100.0	100.0	50.0	21.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.3
UCF (%)	100.0	100.0	100.0	50.0	21.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.3
LF (%)	99.0	99.4	99.2	48.9	12.1	94.5	94.8	95.0	96.7	96.1	98.9	99.0	86.1
OF (%)	100.0	100.0	100.0	53.1	18.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.2
EUf (%)	0.0	0.0	0.0	50.0	78.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.7
PUf (%)	0.0	0.0	0.0	50.0	74.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4
UCLF (%)	0.0	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/06/1969
 Date of First Criticality: 17/12/1974
 Date of Grid Connection: 21/12/1974
 Date of Commercial Operation: 21/12/1974

Lifetime Generation: 142230.5 GW(e).h
 Cumulative Energy Availability Factor: 88.3%
 Cumulative Load Factor: 87.7%
 Cumulative Unit Capability Factor: 88.3%
 Cumulative Energy Unavailability Factor: 11.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	7.4	513	100.0	100.0	100.0	100.0	5.6	5.6	104	41.3
1975	3176.2	520	69.9	70.7	69.9	70.7	69.9	68.1	7035	80.5
1976	2660.6	520	58.2	64.6	58.2	64.6	58.2	63.2	6657	75.8
1977	3882.3	511	86.7	71.8	86.7	71.8	86.7	70.9	7807	89.1
1978	3924.4	507	88.2	75.8	88.2	75.8	88.4	75.2	8126	92.8
1979	4193.0	500	94.6	79.4	94.6	79.4	95.7	79.2	8661	98.9
1980	3468.7	500	81.5	79.8	81.4	79.8	79.0	79.1	7167	81.6
1981	3092.9	500	71.4	78.6	71.4	78.6	70.6	77.9	6292	71.8
1982	3857.7	500	90.0	80.0	89.8	80.0	88.1	79.2	7844	89.5
1983	3716.3	500	86.5	80.7	86.5	80.7	84.8	79.8	7574	86.5
1984	3906.0	500	89.2	81.6	89.2	81.5	88.9	80.7	7830	89.1
1985	3612.5	500	92.9	82.6	92.9	82.6	82.5	80.9	7378	84.2
1986	3854.0	500	90.6	83.2	90.6	83.2	88.0	81.5	7930	90.5
1987	4462.2	500	100.0	84.5	100.0	84.5	101.9	83.0	8760	100.0
1988	3886.2	500	88.2	84.8	88.2	84.8	88.5	83.4	7773	88.5
1989	3887.2	500	96.9	85.6	96.9	85.6	88.7	83.7	7798	89.0
1990	3803.7	500	83.3	85.4	83.3	85.4	86.8	83.9	7602	86.8
1991	4480.4	502	100.0	86.3	100.0	86.3	101.8	85.0	8760	100.0
1992	3223.5	500	73.5	85.6	73.5	85.6	73.4	84.3	6516	74.2
1993	3746.2	503	83.5	85.5	83.5	85.5	85.0	84.4	7338	83.8
1994	4553.0	512	99.7	86.2	99.7	86.2	101.5	85.3	8734	99.7
1995	3968.2	512	87.5	86.3	87.5	86.2	88.5	85.4	7666	87.5
1996	4485.1	512	99.2	86.9	98.6	86.8	99.7	86.1	8653	98.5
1997	3642.9	512	82.0	86.6	82.0	86.6	81.2	85.9	7180	82.0
1998	3333.7	512	74.8	86.1	74.8	86.1	74.3	85.4	6555	74.8
1999	4597.4	522	99.2	86.7	99.2	86.6	100.5	86.0	8690	99.2
2000	4182.3	522	89.0	86.8	89.0	86.7	91.2	86.2	7820	89.0
2001	4271.0	522	91.7	87.0	91.7	86.9	93.4	86.5	8031	91.7
2002	4296.0	522	92.4	87.2	92.4	87.1	93.9	86.7	8082	92.3
2003	4241.0	522	92.0	87.3	92.0	87.3	92.7	87.0	8058	92.0
2004	4660.3	522	99.5	87.7	99.5	87.7	101.6	87.5	8737	99.5
2005	3848.6	522	83.3	87.6	83.3	87.6	84.2	87.4	7296	83.3
2006	4012.4	522	87.5	87.6	87.5	87.6	87.7	87.4	7665	87.5
2007	4456.6	545	96.9	87.9	96.9	87.9	93.3	87.6	8488	96.9
2008	4059.4	545	88.4	87.9	88.4	87.9	84.8	87.5	7768	88.4
2009	4653.3	545	100.0	88.3	100.0	88.3	97.5	87.8	8760	100.0
2010	4128.1	554	89.3	88.3	89.3	88.3	86.1	87.7	7817	89.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		27			207	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	914			578		
D. Inspection, maintenance or repair without refuelling				83		
E. Testing of plant systems or components				4		
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					15	1
Subtotal	914	27	0	665	223	1
Total		941			889	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		40
13. Reactor Auxiliary Systems		3
14. Safety Systems		3
15. Reactor Cooling Systems		35
16. Steam generation systems		6
31. Turbine and auxiliaries		68
32. Feedwater and Main Steam System	27	3
33. Circulating Water System		2
35. All other I&C Systems		0
41. Main Generator Systems		6
42. Electrical Power Supply Systems		28
Total	27	194

US-254 QUAD CITIES-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 882.0 MW(e)
 Design Net Capacity: 789.0 MW(e)
 Design Discharge Burnup: 47000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7646.1 GW(e).h
 Energy Availability Factor: 99.3%
 Load Factor: 99.0%
 Operating Factor: 99.3%
 Energy Unavailability Factor: 0.7%
 Total Off-line Time: 62 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	662.7	596.8	660.6	639.0	657.1	630.6	648.0	580.4	632.0	638.5	639.8	660.6	7646.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.9	100.0	100.0	100.0	100.0	99.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.9	100.0	100.0	100.0	100.0	99.3
LF (%)	101.0	100.7	100.8	100.6	100.1	99.3	98.8	88.4	99.5	97.3	100.6	100.7	99.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.7	100.0	100.0	100.0	100.0	99.3
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 15/02/1967 Lifetime Generation: 194927.8 GW(e).h
 Date of First Criticality: 18/10/1971 Cumulative Energy Availability Factor: 78.1%
 Date of Grid Connection: 04 Dec 1972 Cumulative Load Factor: 72.9%
 Date of Commercial Operation: 18/02/1973 Cumulative Unit Capability Factor: 78.1%
 Cumulative Energy Unavailability Factor: 21.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	4451.0	800	87.0	87.0	87.0	87.0	69.4	69.4	6667	83.2
1974	3464.1	800	61.4	73.6	61.4	73.6	49.4	59.0	5365	61.2
1975	4413.4	800	61.0	69.3	61.0	69.3	63.0	60.3	7531	86.0
1976	3401.7	769	50.4	64.6	50.4	64.6	50.4	57.9	5699	64.9
1977	3527.4	769	52.4	62.2	52.4	62.2	52.4	56.8	6176	70.5
1978	4782.0	769	71.0	63.7	71.0	63.7	71.0	59.1	8315	94.9
1979	4786.5	769	71.1	64.7	71.1	64.7	71.1	60.8	7096	81.0
1980	3468.8	769	67.4	65.1	66.7	65.0	51.4	59.6	5840	66.5
1981	5726.8	769	94.3	68.3	94.3	68.2	85.0	62.4	8244	94.1
1982	3258.0	769	68.5	68.3	68.5	68.2	48.4	61.0	5951	67.9
1983	5776.4	769	94.7	70.7	94.7	70.6	85.7	63.3	8258	94.3
1984	3358.5	769	53.4	69.3	53.4	69.2	49.7	62.2	4687	53.4
1985	6072.3	769	94.1	71.2	94.1	71.1	90.1	64.3	8242	94.1
1986	4426.2	769	68.9	71.0	68.9	70.9	65.7	64.4	6035	68.9
1987	4456.1	769	70.1	70.9	70.1	70.9	66.1	64.5	6141	70.1
1988	5662.0	769	93.4	72.3	93.4	72.3	83.8	65.7	8199	93.3
1989	4280.4	769	73.4	72.4	73.4	72.4	63.5	65.6	6428	73.4
1990	5345.6	769	83.1	73.0	83.1	73.0	79.4	66.4	7276	83.1
1991	3549.5	769	56.6	72.1	55.8	72.1	52.7	65.6	4882	55.7
1992	4166.1	769	70.1	72.0	70.1	72.0	61.7	65.4	6158	70.1
1993	5042.5	769	78.8	72.4	78.8	72.3	74.9	65.9	6902	78.8
1994	1670.2	769	28.9	70.4	28.9	70.3	24.8	64.0	2526	28.8
1995	5886.2	769	90.6	71.3	90.6	71.2	87.4	65.0	7934	90.6
1996	2680.6	769	42.9	70.1	42.9	70.0	39.7	64.0	3769	42.9
1997	5565.5	769	88.7	70.8	88.7	70.8	82.6	64.7	7764	88.6
1998	3142.9	769	49.1	70.0	49.1	69.9	46.7	64.0	4299	49.1
1999	6337.6	769	93.7	70.9	93.7	70.8	94.1	65.1	8210	93.7
2000	6168.1	769	93.8	71.7	93.8	71.6	91.3	66.1	8242	93.8
2001	6710.9	769	99.2	72.6	99.2	72.6	99.6	67.2	8691	99.2
2002	5709.5	855	86.6	73.1	86.6	73.1	84.0	67.8	7564	86.3
2003	6810.2	855	92.4	73.8	92.4	73.7	90.9	68.6	8013	91.5
2004	6502.8	855	100.0	74.7	100.0	74.7	86.6	69.2	8784	100.0
2005	6281.1	864	89.9	75.2	89.9	75.2	83.0	69.7	7875	89.9
2006	6747.3	867	93.2	75.8	93.2	75.8	88.8	70.3	8161	93.2
2007	6951.0	867	93.7	76.4	93.7	76.3	91.5	71.0	8212	93.7
2008	7490.1	867	100.0	77.1	100.0	77.0	98.4	71.8	8784	100.0
2009	6230.8	867	90.0	77.5	90.0	77.4	82.0	72.1	7879	89.9
2010	7646.1	882	99.3	78.1	99.3	78.1	99.0	72.9	8698	99.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		61			375	
B. Refuelling without a maintenance					65	
C. Inspection, maintenance or repair combined with refuelling				1049		
D. Inspection, maintenance or repair without refuelling				152	3	
E. Testing of plant systems or components				7	7	
H. Nuclear regulatory requirements					5	1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	42	1
Subtotal	0	61	0	1208	497	2
Total		61			1707	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		22
13. Reactor Auxiliary Systems		3
14. Safety Systems		7
15. Reactor Cooling Systems		97
31. Turbine and auxiliaries	61	72
32. Feedwater and Main Steam System		21
41. Main Generator Systems		15
42. Electrical Power Supply Systems		34
XX. Miscellaneous Systems		11
Total	61	282

US-265 QUAD CITIES-2

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 892.0 MW(e)
 Design Net Capacity: 789.0 MW(e)
 Design Discharge Burnup: 47000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7150.1 GW(e).h
 Energy Availability Factor: 89.9%
 Load Factor: 91.5%
 Operating Factor: 89.6%
 Energy Unavailability Factor: 10.1%
 Total Off-line Time: 911 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	670.2	604.8	285.5	239.6	685.8	657.4	671.5	596.6	665.6	696.4	678.5	698.4	7150.1
EAF (%)	100.0	100.0	46.6	41.9	100.0	100.0	100.0	90.6	100.0	100.0	100.0	100.0	89.9
UCF (%)	100.0	100.0	46.6	41.9	100.0	100.0	100.0	90.6	100.0	100.0	100.0	100.0	89.9
LF (%)	101.0	100.9	43.1	37.3	103.3	102.4	101.2	89.9	103.6	104.9	105.5	105.2	91.5
OF (%)	100.0	100.0	45.1	40.1	100.0	100.0	100.0	90.3	100.0	100.0	100.0	100.0	89.6
EUF (%)	0.0	0.0	53.4	58.1	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	10.1
PUF (%)	0.0	0.0	53.4	44.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2
UCLF (%)	0.0	0.0	0.0	13.7	0.0	0.0	0.0	9.4	0.0	0.0	0.0	0.0	1.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 15/02/1967
 Date of First Criticality: 26/04/1972
 Date of Grid Connection: 23/05/1972
 Date of Commercial Operation: 03 Oct 1973

Lifetime Generation: 190461.4 GW(e).h
 Cumulative Energy Availability Factor: 76.4%
 Cumulative Load Factor: 71.4%
 Cumulative Unit Capability Factor: 77.1%
 Cumulative Energy Unavailability Factor: 23.6%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	4392.2	800	86.4	86.4	86.4	86.4	74.8	74.8	6238	84.9
1974	4643.8	800	82.6	84.3	82.6	84.3	66.3	70.1	7232	82.6
1975	2490.9	798	35.7	67.2	35.7	67.2	35.6	58.0	4555	52.0
1976	4320.0	769	64.0	66.4	64.0	66.4	64.0	59.5	7143	81.3
1977	4369.3	769	64.9	66.1	64.9	66.1	64.9	60.6	7118	81.3
1978	4429.1	769	65.7	66.0	65.7	66.0	65.7	61.5	7022	80.2
1979	3993.6	769	59.3	65.1	59.3	65.1	59.3	61.1	7686	87.7
1980	3651.6	769	62.8	64.8	62.5	64.7	54.1	60.3	5486	62.5
1981	3770.7	769	68.1	65.2	68.1	65.1	56.0	59.8	5957	68.0
1982	5062.3	769	84.0	67.0	84.0	67.0	75.1	61.3	7343	83.8
1983	3158.5	769	64.2	66.8	64.2	66.8	46.9	60.0	5620	64.2
1984	4984.4	769	77.9	67.7	77.9	67.7	73.8	61.2	6837	77.8
1985	4560.7	769	71.3	68.0	71.3	68.0	67.7	61.7	6247	71.3
1986	4728.0	769	74.2	68.4	74.2	68.4	70.2	62.3	6399	73.0
1987	4953.0	769	78.1	69.1	78.1	69.1	73.5	63.0	6832	78.0
1988	4178.9	769	70.5	69.2	70.5	69.2	61.9	63.0	6193	70.5
1989	5743.1	769	95.5	70.7	95.5	70.7	85.3	64.3	8363	95.5
1990	4373.6	769	70.4	70.7	70.4	70.7	64.9	64.3	6186	70.6
1991	5285.2	769	88.3	71.6	88.3	71.6	78.5	65.1	7731	88.3
1992	3464.2	769	64.0	71.2	64.0	71.2	51.3	64.4	5621	64.0
1993	3111.8	769	51.8	70.3	51.8	70.3	46.2	63.5	4538	51.8
1994	4013.3	769	65.7	70.1	65.7	70.1	59.6	63.3	5745	65.6
1995	2497.0	769	45.3	69.0	45.3	69.0	37.1	62.2	3966	45.3
1996	4666.8	769	98.8	70.3	72.3	69.2	69.1	62.5	6348	72.3
1997	2627.7	769	42.3	69.2	42.3	68.1	39.0	61.5	3718	42.4
1998	3819.6	769	59.0	68.8	58.2	67.7	56.7	61.3	5095	58.2
1999	6596.7	769	97.5	69.8	97.5	68.8	97.9	62.7	8537	97.5
2000	6220.6	769	92.9	70.7	92.9	69.7	92.1	63.7	8156	92.9
2001	6273.8	769	91.9	71.4	91.9	70.4	93.1	64.8	8058	92.0
2002	6556.8	855	90.4	72.1	90.4	71.2	89.8	65.7	7852	89.6
2003	6975.1	855	94.0	72.9	94.0	72.0	93.1	66.6	8181	93.4
2004	6179.4	855	90.5	73.5	90.5	72.6	82.3	67.2	7955	90.6
2005	7036.9	864	97.4	74.3	97.4	73.4	93.0	68.0	8533	97.4
2006	6611.0	867	91.3	74.8	91.3	74.0	87.0	68.7	8000	91.3
2007	7505.8	867	99.6	75.6	99.6	74.8	98.8	69.6	8720	99.5
2008	6734.6	867	89.4	76.0	89.4	75.3	88.4	70.2	7852	89.4
2009	6909.4	867	100.0	76.7	100.0	76.0	91.0	70.8	8760	100.0
2010	7150.1	892	89.9	77.1	89.9	76.4	91.5	71.4	7849	89.6

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		173			474	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling	735			938	57	
D. Inspection, maintenance or repair without refuelling				139		
E. Testing of plant systems or components	1			3	0	
H. Nuclear regulatory requirements					10	0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				90	63	61
Subtotal	736	173	0	1170	617	61
Total		909			1848	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		8
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		4
14. Safety Systems		16
15. Reactor Cooling Systems	71	65
16. Steam generation systems		11
17. Safety I&C Systems (excluding reactor I&C)		7
21. Fuel Handling and Storage Facilities		18
31. Turbine and auxiliaries	101	81
32. Feedwater and Main Steam System		43
33. Circulating Water System		7
35. All other I&C Systems		1
41. Main Generator Systems		33
42. Electrical Power Supply Systems		68
XX. Miscellaneous Systems		42
Total	172	416

US-244 R.E. GINNA

Operator: CONSTELL (CONSTELLATION Energy Nuclear Group, LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 580.0 MW(e)
Design Net Capacity: 470.0 MW(e)
Design Discharge Burnup: 39000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4948.4 GW(e).h
Energy Availability Factor: 98.8%
Load Factor: 97.4%
Operating Factor: 98.8%
Energy Unavailability Factor: 1.2%
Total Off-line Time: 106 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	340.6	388.4	431.7	418.2	430.8	411.6	417.5	421.3	409.2	429.6	417.4	432.0	4948.4
EAF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8
UCF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8
LF (%)	78.9	99.7	100.2	100.1	99.8	98.6	96.8	97.6	98.0	99.6	99.8	100.1	97.4
OF (%)	85.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.8
EUF (%)	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/04/1966
Date of First Criticality: 11 Aug 1969
Date of Grid Connection: 12 Feb 1969
Date of Commercial Operation: 07 Jan 1970

Lifetime Generation: 143312.6 GW(e).h
Cumulative Energy Availability Factor: 85.2%
Cumulative Load Factor: 83.3%
Cumulative Unit Capability Factor: 85.2%
Cumulative Energy Unavailability Factor: 14.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1970	1597.0	448	100.0	100.0	100.0	100.0	80.7	80.7	3868	87.6
1971	2871.8	493	100.0	100.0	100.0	100.0	66.5	71.0	6592	75.3
1972	2572.1	504	100.0	100.0	100.0	100.0	58.1	65.7	6029	68.6
1973	3398.8	490	95.0	98.6	95.0	98.6	79.2	69.5	8325	95.0
1974	2097.2	490	48.9	87.5	48.9	87.5	48.9	64.9	5465	62.4
1975	3041.1	470	73.4	85.0	73.4	85.0	73.9	66.5	6709	76.6
1976	2060.8	470	49.7	79.8	49.7	79.8	49.9	64.0	5113	58.2
1977	3028.5	470	73.6	79.0	73.6	79.0	73.6	65.3	7489	85.5
1978	3218.7	470	77.5	78.8	77.5	78.8	78.2	66.7	7058	80.6
1979	2960.5	470	71.3	78.0	71.3	78.0	71.9	67.3	6375	72.8
1980	3093.5	470	76.0	77.8	76.0	77.8	74.9	68.0	6673	76.0
1981	3322.5	470	82.2	78.2	82.2	78.2	80.7	69.1	7194	82.1
1982	2408.0	470	58.9	76.7	58.9	76.7	58.5	68.2	5150	58.8
1983	3040.1	470	74.9	76.5	74.9	76.5	73.8	68.7	6529	74.5
1984	3156.8	470	77.2	76.6	77.2	76.6	76.5	69.2	6779	77.2
1985	3620.3	470	87.9	77.3	87.9	77.3	87.9	70.4	7700	87.9
1986	3610.3	470	87.4	77.9	87.4	77.9	87.7	71.4	7659	87.4
1987	3797.7	470	91.3	78.7	91.3	78.7	92.2	72.6	7994	91.3
1988	3533.2	470	86.5	79.1	86.5	79.1	85.6	73.3	7592	86.4
1989	3073.5	470	75.0	78.9	75.0	78.9	74.6	73.4	6569	75.0
1990	3451.4	470	83.6	79.1	83.6	79.1	83.8	73.9	7325	83.6
1991	3483.3	470	86.0	79.4	86.0	79.4	84.6	74.4	7536	86.0
1992	3483.4	470	85.8	79.7	85.8	79.7	84.4	74.8	7536	85.8
1993	3499.4	470	85.7	80.0	85.7	80.0	85.0	75.2	7509	85.7
1994	3373.7	470	82.4	80.1	82.4	80.1	81.9	75.5	7219	82.4
1995	3638.6	470	88.8	80.4	88.8	80.4	88.4	76.0	7776	88.8
1996	2898.1	470	70.4	80.0	70.4	80.0	70.2	75.8	6175	70.3
1997	3894.7	480	91.7	80.5	91.7	80.5	92.6	76.4	8011	91.4
1998	4308.6	480	100.0	81.2	100.0	81.2	102.5	77.3	8760	100.0
1999	3534.1	480	85.3	81.3	85.3	81.3	84.0	77.6	7444	85.0
2000	3814.1	480	91.0	81.6	91.0	81.6	90.5	78.0	8001	91.1
2001	4286.3	480	100.0	82.2	100.0	82.2	101.9	78.8	8760	100.0
2002	3843.3	480	90.4	82.5	90.4	82.5	91.4	79.2	7951	90.8
2003	3868.6	480	90.1	82.7	90.1	82.7	92.0	79.5	7925	90.5
2004	4308.5	480	99.4	83.2	99.4	83.2	102.2	80.2	8733	99.4
2005	3996.7	498	93.3	83.5	93.3	83.5	91.6	80.5	8166	93.2
2006	4119.2	493	92.2	83.7	92.2	83.7	95.3	81.0	8157	93.1
2007	4930.5	498	99.0	84.2	99.0	84.2	113.0	81.9	8675	99.0
2008	4744.0	498	94.3	84.4	94.3	84.4	108.4	82.6	8280	94.3
2009	4630.9	580	94.9	84.7	94.9	84.7	91.1	82.8	8235	94.0
2010	4948.4	580	98.8	85.2	98.8	85.2	97.4	83.3	8654	98.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1971 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		105			195	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling				1061		
D. Inspection, maintenance or repair without refuelling				70	1	
E. Testing of plant systems or components				1	0	
H. Nuclear regulatory requirements					0	17
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	
L. Human factor related					0	
Subtotal	0	105	0	1132	207	17
Total		105			1356	

7. Equipment Related Full Outages, Analysis by System

System	2010	1971 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		14
13. Reactor Auxiliary Systems		2
14. Safety Systems		14
15. Reactor Cooling Systems		9
16. Steam generation systems		38
31. Turbine and auxiliaries	105	37
32. Feedwater and Main Steam System		33
33. Circulating Water System		5
35. All other I&C Systems		1
42. Electrical Power Supply Systems		16
Total	105	170

US-458 RIVER BEND-1

Operator: ENTERGY (ENERGY NUCLEAR OPERATIONS, Inc.)
Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
Net Reference Unit Power (RUP) at the beginning of 2010: 974.0 MW(e)
Design Net Capacity: 966.0 MW(e)
Design Discharge Burnup: 29600 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8363.2 GW(e).h
Energy Availability Factor: 98.7%
Load Factor: 98.0%
Operating Factor: 98.7%
Energy Unavailability Factor: 1.3%
Total Off-line Time: 118 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	735.8	658.3	715.2	708.3	728.7	683.3	697.1	599.9	695.6	732.7	672.6	735.6	8363.2
EAFF (%)	100.0	100.0	100.0	100.0	100.0	100.0	96.8	87.6	100.0	100.0	100.0	100.0	98.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	96.8	87.6	100.0	100.0	100.0	98.7
LF (%)	101.5	100.6	98.8	101.0	100.6	97.4	96.2	82.8	99.2	101.1	95.8	101.5	98.0
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	97.0	87.1	100.0	100.0	100.0	100.0	98.7
EUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.4	0.0	0.0	0.0	0.0	1.3
PUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.4	0.0	0.0	0.0	0.0	1.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUFF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/03/1977
Date of First Criticality: 31/10/1985
Date of Grid Connection: 12 Mar 1985
Date of Commercial Operation: 16/06/1986

Lifetime Generation: 164124.5 GW(e).h
Cumulative Energy Availability Factor: 82.6%
Cumulative Load Factor: 79.9%
Cumulative Unit Capability Factor: 82.8%
Cumulative Energy Unavailability Factor: 17.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1986	2310.4	936	54.1	54.1	54.1	54.1	48.0	48.0	2763	53.8
1987	4964.4	936	66.7	62.0	66.7	62.0	60.5	55.9	5836	66.6
1988	7249.0	936	92.8	73.9	92.8	73.9	88.2	68.4	8149	92.8
1989	4785.0	936	66.9	72.0	66.9	72.0	58.4	65.6	5853	66.8
1990	5592.6	936	75.8	72.8	75.8	72.8	68.2	66.2	6642	75.8
1991	6687.2	936	85.7	75.1	85.7	75.1	81.6	68.9	7507	85.7
1992	2762.7	936	36.5	69.3	36.5	69.3	33.6	63.6	3210	36.5
1993	5257.9	936	69.4	69.3	69.4	69.3	64.1	63.6	6076	69.4
1994	4886.2	936	62.3	68.5	62.3	68.5	59.6	63.2	5455	62.3
1995	7930.8	936	99.4	71.7	99.4	71.7	96.7	66.7	8704	99.4
1996	6860.3	936	84.2	72.9	84.2	72.9	83.4	68.2	7391	84.1
1997	6822.7	936	84.8	73.9	84.8	73.9	83.2	69.5	7427	84.8
1998	7833.5	936	95.9	75.7	95.9	75.7	95.5	71.6	8404	95.9
1999	5704.8	936	74.0	75.5	74.0	75.5	69.6	71.5	6476	73.9
2000	7352.7	936	88.8	76.4	88.8	76.4	89.4	72.7	7795	88.7
2001	7811.8	936	92.4	77.5	92.4	77.5	95.3	74.1	8120	92.7
2002	8472.4	966	97.9	78.7	97.9	78.7	100.1	75.7	8579	97.9
2003	7653.2	966	91.8	79.5	91.8	79.5	90.4	76.6	8050	91.9
2004	7427.4	966	88.2	80.0	88.2	80.0	87.5	77.2	7758	88.3
2005	7822.5	978	93.2	80.7	93.2	80.7	91.3	78.0	8162	93.2
2006	7478.3	966	90.4	81.2	90.4	81.2	88.4	78.5	7921	90.4
2007	7184.6	970	90.5	81.6	90.5	81.6	84.6	78.8	7916	90.4
2008	6366.6	970	83.0	81.7	77.1	81.4	74.7	78.6	6771	77.1
2009	7833.4	978	92.4	82.1	92.4	81.9	91.4	79.1	8085	92.3
2010	8363.2	974	98.7	82.8	98.7	82.6	98.0	79.9	8642	98.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				5	355	
B. Refuelling without a maintenance					23	
C. Inspection, maintenance or repair combined with refuelling				808		
D. Inspection, maintenance or repair without refuelling	116			177	7	
E. Testing of plant systems or components				12	4	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				10	136	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						20
Subtotal	116	0	0	1012	525	20
Total		116			1557	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		69
13. Reactor Auxiliary Systems		3
15. Reactor Cooling Systems		85
17. Safety I&C Systems (excluding reactor I&C)		10
31. Turbine and auxiliaries		48
32. Feedwater and Main Steam System		44
33. Circulating Water System		3
35. All other I&C Systems		10
41. Main Generator Systems		24
42. Electrical Power Supply Systems		31
XX. Miscellaneous Systems		5
Total	0	332

US-272 SALEM-1

Operator: PSEG (PSEG Nuclear LLC)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1174.0 MW(e)
 Design Net Capacity: 1090.0 MW(e)
 Design Discharge Burnup: 40000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8776.6 GW(e).h
 Energy Availability Factor: 87.4%
 Load Factor: 85.3%
 Operating Factor: 87.4%
 Energy Unavailability Factor: 12.6%
 Total Off-line Time: 1107 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	875.9	799.0	861.5	87.7	860.1	773.0	373.0	852.7	820.0	731.7	856.3	885.5	8776.6
EAF (%)	100.0	100.0	100.0	14.9	100.0	95.3	45.6	100.0	100.0	92.6	100.0	100.0	87.4
UCF (%)	100.0	100.0	100.0	14.9	100.0	95.3	45.6	100.0	100.0	92.6	100.0	100.0	87.4
LF (%)	100.3	101.3	98.8	10.4	98.5	91.4	42.7	97.6	97.0	83.8	101.2	101.4	85.3
OF (%)	100.0	100.0	100.0	14.9	100.0	95.3	45.6	100.0	100.0	92.6	100.0	100.0	87.4
EUAF (%)	0.0	0.0	0.0	85.1	0.0	4.7	54.4	0.0	0.0	7.4	0.0	0.0	12.6
PUF (%)	0.0	0.0	0.0	85.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	4.7	54.4	0.0	0.0	7.4	0.0	0.0	5.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/09/1968
 Date of First Criticality: 12 Nov 1976
 Date of Grid Connection: 25/12/1976
 Date of Commercial Operation: 30/06/1977

Lifetime Generation: 215356.9 GW(e).h
 Cumulative Energy Availability Factor: 68.6%
 Cumulative Load Factor: 65.6%
 Cumulative Unit Capability Factor: 68.7%
 Cumulative Energy Unavailability Factor: 31.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1977	2058.8	1079	50.8	50.8	50.8	50.8	37.2	37.2	2432	47.4
1978	4537.0	1079	48.0	49.0	48.0	49.0	48.0	44.0	4862	55.5
1979	2084.3	1079	22.0	38.6	22.0	38.6	22.1	35.5	2231	25.5
1980	5689.8	1079	74.2	48.6	69.5	47.2	60.0	42.4	6075	69.2
1981	6191.3	1079	78.5	55.1	78.5	54.0	65.5	47.4	6839	78.1
1982	4107.4	1079	47.0	53.6	47.0	52.8	43.5	46.7	4192	47.9
1983	5408.8	1079	57.6	54.2	57.6	53.5	57.2	48.3	5127	58.5
1984	2160.1	1079	27.1	50.6	27.1	50.0	22.8	44.9	2378	27.1
1985	9007.5	1079	95.2	55.8	95.2	55.3	95.3	50.8	8345	95.3
1986	7084.0	1083	78.6	58.2	78.6	57.7	74.6	53.3	6921	79.0
1987	6216.6	1106	73.1	59.6	72.6	59.2	64.2	54.3	6362	72.6
1988	7418.6	1106	77.9	61.3	77.9	60.8	76.4	56.3	6841	77.9
1989	6213.3	1106	69.2	61.9	69.2	61.5	64.1	56.9	6059	69.2
1990	5999.2	1106	67.0	62.3	67.0	61.9	61.9	57.3	5868	67.0
1991	6810.3	1106	74.0	63.1	74.0	62.7	70.3	58.2	6479	74.0
1992	5307.8	1106	58.0	62.8	58.0	62.4	54.6	58.0	5090	57.9
1993	5870.6	1106	65.6	62.9	65.6	62.6	60.6	58.1	5746	65.6
1994	5779.3	1106	67.0	63.2	67.0	62.9	59.7	58.2	5865	67.0
1995	2554.4	1106	30.1	61.4	30.1	61.1	26.4	56.5	2632	30.0
1996	0.0	1106	0.0	58.2	0.0	57.9	0.0	53.6	0	0.0
1997	0.0	1106	0.0	55.3	0.0	55.1	0.0	50.9	0	0.0
1998	6475.6	1106	70.8	56.1	70.8	55.8	66.8	51.7	6199	70.8
1999	8009.2	1106	87.5	57.5	87.5	57.2	82.7	53.1	7663	87.5
2000	8952.6	1106	94.8	59.1	94.8	58.8	92.2	54.7	8328	94.8
2001	7709.4	1096	80.9	59.9	80.9	59.7	80.8	55.8	7116	81.2
2002	8620.6	1096	89.5	61.1	89.5	60.9	89.8	57.1	7855	89.7
2003	9096.7	1096	95.8	62.4	95.8	62.2	94.7	58.5	8401	95.9
2004	7452.7	1159	77.6	63.0	77.6	62.8	75.2	59.2	6766	77.0
2005	9440.6	1111	92.5	64.0	92.5	63.8	97.0	60.5	8105	92.5
2006	10228.1	1174	99.6	65.3	99.6	65.1	99.5	61.9	8725	99.6
2007	9158.5	1174	91.5	66.2	91.5	66.1	89.1	62.8	8013	91.5
2008	9333.8	1174	91.7	67.1	91.7	66.9	90.5	63.8	8053	91.7
2009	10221.8	1174	99.7	68.1	99.7	68.0	99.4	64.9	8735	99.7
2010	8776.6	1174	87.4	68.7	87.4	68.6	85.3	65.6	7653	87.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1977 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		493			1262	
B. Refuelling without a maintenance					9	
C. Inspection, maintenance or repair combined with refuelling	612			981		
D. Inspection, maintenance or repair without refuelling				95	35	
E. Testing of plant systems or components				1	1	
H. Nuclear regulatory requirements					112	32
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				12	97	0
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					4	
Z. Others					8	
Subtotal	612	493	0	1089	1528	33
Total		1105			2650	

7. Equipment Related Full Outages, Analysis by System

System	2010	1977 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		78
13. Reactor Auxiliary Systems		6
14. Safety Systems		17
15. Reactor Cooling Systems		84
16. Steam generation systems		449
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		235
32. Feedwater and Main Steam System		107
33. Circulating Water System		52
35. All other I&C Systems		6
41. Main Generator Systems		103
42. Electrical Power Supply Systems	459	29
XX. Miscellaneous Systems	33	3
Total	492	1173

US-311 SALEM-2

Operator: PSEG (PSEG Nuclear LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1158.0 MW(e)
Design Net Capacity: 1115.0 MW(e)
Design Discharge Burnup: 40000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9954.8 GW(e).h
Energy Availability Factor: 98.4%
Load Factor: 98.1%
Operating Factor: 98.4%
Energy Unavailability Factor: 1.6%
Total Off-line Time: 140 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	763.2	799.3	878.5	804.9	874.5	837.0	851.2	854.0	831.3	734.1	847.9	878.9	9954.8
EAF (%)	90.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.8	100.0	100.0	98.4
UCF (%)	90.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.8	100.0	100.0	98.4
LF (%)	88.6	102.7	102.1	96.5	101.5	100.4	98.8	99.1	99.7	85.2	101.6	102.0	98.1
OF (%)	90.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	90.7	100.0	100.0	98.4
EUf (%)	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	1.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0	1.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/09/1968
Date of First Criticality: 08 Aug 1980
Date of Grid Connection: 06 Mar 1981
Date of Commercial Operation: 13/10/1981

Lifetime Generation: 193213.8 GW(e).h
Cumulative Energy Availability Factor: 71.2%
Cumulative Load Factor: 67.3%
Cumulative Unit Capability Factor: 71.2%
Cumulative Energy Unavailability Factor: 28.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	1632.1	1105	96.3	96.3	96.3	96.3	76.9	76.9	1817	94.6
1982	7941.7	1106	97.5	97.3	97.5	97.3	82.0	81.1	8517	97.2
1983	775.2	1106	12.6	59.2	12.6	59.2	8.0	48.1	1078	12.3
1984	3225.7	1106	36.4	52.1	36.4	52.1	33.2	43.5	3192	36.3
1985	5033.8	1106	56.2	53.1	56.2	53.1	52.0	45.5	4923	56.2
1986	5317.7	1106	61.6	54.7	61.6	54.7	54.9	47.3	5388	61.5
1987	6176.6	1106	72.4	57.5	72.4	57.5	63.8	49.9	6338	72.4
1988	5982.2	1106	66.5	58.8	66.5	58.8	61.6	51.6	5838	66.5
1989	7824.6	1106	84.7	61.9	84.7	61.9	80.8	55.1	7419	84.7
1990	5446.1	1106	72.2	63.0	72.2	63.0	56.2	55.2	5163	58.9
1991	7662.3	1106	82.1	64.9	82.1	64.9	79.1	57.6	7188	82.1
1992	4744.6	1106	53.1	63.8	53.1	63.8	48.8	56.8	4657	53.0
1993	5575.5	1106	60.9	63.6	60.9	63.6	57.5	56.8	5328	60.8
1994	5606.8	1106	69.4	64.0	69.4	64.0	57.9	56.9	6076	69.4
1995	2071.7	1106	25.8	61.4	25.8	61.4	21.4	54.4	2261	25.8
1996	0.0	1106	0.0	57.3	0.0	57.3	0.0	50.8	0	0.0
1997	2564.3	1106	32.4	55.8	32.4	55.8	26.5	49.3	2834	32.4
1998	7797.2	1106	83.2	57.4	83.2	57.4	80.5	51.1	7287	83.2
1999	7949.4	1106	84.8	58.9	84.8	58.9	82.0	52.8	7431	84.8
2000	8381.7	1106	89.0	60.4	89.0	60.4	86.3	54.6	7819	89.0
2001	9517.6	1092	99.7	62.4	99.7	62.4	100.0	56.8	8736	99.7
2002	8367.4	1092	86.8	63.5	86.8	63.5	87.5	58.2	7620	87.0
2003	8095.6	1116	83.7	64.4	83.7	64.4	84.5	59.4	7355	84.0
2004	8799.8	1116	90.3	65.5	90.3	65.5	89.8	60.7	7945	90.4
2005	8886.0	1129	90.1	66.6	90.1	66.6	89.8	61.9	7897	90.1
2006	9147.4	1130	93.9	67.7	93.9	67.7	92.4	63.2	8220	93.8
2007	9669.4	1130	97.1	68.8	97.1	68.8	97.7	64.5	8506	97.1
2008	8222.0	1156	82.8	69.3	82.8	69.3	81.6	65.2	7285	82.9
2009	9427.5	1158	92.1	70.2	92.1	70.2	92.9	66.2	8069	92.1
2010	9954.8	1158	98.4	71.2	98.4	71.2	98.1	67.3	8620	98.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		139			1055	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling				940		
D. Inspection, maintenance or repair without refuelling				105	23	
E. Testing of plant systems or components				0	0	
H. Nuclear regulatory requirements						18
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				4	281	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)					5	
Z. Others					11	
Subtotal	0	139	0	1049	1401	0
Total		139			2450	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		41
13. Reactor Auxiliary Systems		5
14. Safety Systems		50
15. Reactor Cooling Systems		74
16. Steam generation systems	35	193
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		102
32. Feedwater and Main Steam System		103
33. Circulating Water System	34	7
35. All other I&C Systems		9
41. Main Generator Systems		265
42. Electrical Power Supply Systems	68	189
XX. Miscellaneous Systems		8
Total	137	1048

US-361 SAN ONOFRE-2

Operator: SCE (SOUTHERN CALIFORNIA EDISON Co.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1070.0 MW(e)
 Design Net Capacity: 1070.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7038.6 GW(e).h
 Energy Availability Factor: 72.4%
 Load Factor: 75.1%
 Operating Factor: 72.4%
 Energy Unavailability Factor: 27.6%
 Total Off-line Time: 2419 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	0.0	0.0	0.0	438.0	818.6	814.3	845.4	847.1	810.9	804.6	819.7	839.9	7038.6
EAF (%)	0.0	0.0	-0.1	64.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.4
UCF (%)	0.0	0.0	-0.1	64.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.4
LF (%)	0.0	0.0	0.0	56.9	102.8	105.7	106.2	106.4	105.3	101.1	106.3	105.5	75.1
OF (%)	0.0	0.0	0.0	63.9	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	72.4
EUf (%)	100.0	100.0	100.1	35.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.6
PUf (%)	100.0	100.0	100.1	35.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 03 Jan 1974
 Date of First Criticality: 26/07/1982
 Date of Grid Connection: 20/09/1982
 Date of Commercial Operation: 08 Aug 1983

Lifetime Generation: 209224.4 GW(e).h
 Cumulative Energy Availability Factor: 80.3%
 Cumulative Load Factor: 80.9%
 Cumulative Unit Capability Factor: 80.3%
 Cumulative Energy Unavailability Factor: 19.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2775.6	1083	73.5	73.5	73.5	73.5	69.8	69.8	2560	69.7
1984	5272.6	1070	58.9	63.2	58.9	63.2	56.1	60.2	5167	58.8
1985	5174.0	1070	58.4	61.2	58.4	61.2	55.2	58.1	5114	58.4
1986	6371.3	1070	71.6	64.3	71.6	64.3	68.0	61.0	6266	71.5
1987	6247.3	1070	69.3	65.4	69.3	65.4	66.7	62.3	6067	69.3
1988	9002.7	1070	93.8	70.6	93.8	70.6	95.8	68.5	8237	93.8
1989	5237.7	1070	56.6	68.5	56.6	68.5	55.9	66.5	4956	56.6
1990	8309.7	1070	87.4	71.0	87.4	71.0	88.7	69.5	7657	87.4
1991	5769.4	1070	64.4	70.2	64.4	70.2	61.6	68.5	5637	64.3
1992	8795.2	1070	93.5	72.7	93.5	72.7	93.6	71.2	8214	93.5
1993	7655.0	1070	82.4	73.6	82.4	73.6	81.7	72.2	7213	82.3
1994	9309.2	1070	100.0	75.9	100.0	75.9	99.3	74.6	8760	100.0
1995	6496.0	1070	70.8	75.5	70.8	75.5	69.3	74.2	6197	70.7
1996	8550.2	1070	91.3	76.7	91.3	76.7	91.0	75.4	8016	91.3
1997	6656.3	1070	70.8	76.3	70.8	76.3	71.0	75.1	6197	70.7
1998	8430.2	1070	88.9	77.1	88.9	77.1	89.9	76.1	7792	88.9
1999	8243.5	1070	85.0	77.6	85.0	77.6	87.9	76.8	7447	85.0
2000	8524.2	1070	89.0	78.2	89.0	78.2	90.7	77.6	7818	89.0
2001	9492.0	1070	97.5	79.3	97.5	79.3	101.3	78.9	8538	97.5
2002	8510.5	1070	87.0	79.7	87.0	79.7	90.8	79.5	7618	87.0
2003	9712.5	1070	99.0	80.6	99.0	80.6	103.6	80.7	8671	99.0
2004	8068.0	1070	82.7	80.7	82.7	80.7	85.8	80.9	7263	82.7
2005	8931.7	1070	92.7	81.3	92.7	81.3	95.3	81.6	8117	92.6
2006	6769.3	1070	70.0	80.8	70.0	80.8	72.2	81.2	6134	70.0
2007	8304.1	1070	85.9	81.0	85.9	81.0	88.6	81.5	7526	85.9
2008	8856.8	1070	92.1	81.4	92.1	81.4	94.2	82.0	8089	92.1
2009	5709.8	1070	59.6	80.6	59.6	80.6	60.9	81.2	5220	59.6
2010	7038.6	1070	72.4	80.3	72.4	80.3	75.1	80.9	6341	72.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure				1	318	
B. Refuelling without a maintenance					34	
C. Inspection, maintenance or repair combined with refuelling	2418			1122		
D. Inspection, maintenance or repair without refuelling				158		
E. Testing of plant systems or components				4	3	
H. Nuclear regulatory requirements					28	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				25	22	
L. Human factor related					1	
Subtotal	2418	0	0	1310	406	0
Total		2418			1716	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		1
12. Reactor I&C Systems		17
13. Reactor Auxiliary Systems		2
14. Safety Systems		2
15. Reactor Cooling Systems		71
16. Steam generation systems		64
31. Turbine and auxiliaries		16
32. Feedwater and Main Steam System		64
33. Circulating Water System		17
41. Main Generator Systems		33
42. Electrical Power Supply Systems		15
XX. Miscellaneous Systems		8
Total	0	310

US-362 SAN ONOFRE-3

Operator: SCE (SOUTHERN CALIFORNIA EDISON Co.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1080.0 MW(e)
 Design Net Capacity: 1070.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6792.1 GW(e).h
 Energy Availability Factor: 77.3%
 Load Factor: 71.8%
 Operating Factor: 77.3%
 Energy Unavailability Factor: 22.7%
 Total Off-line Time: 1992 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	839.5	759.4	466.9	418.9	836.6	809.1	836.9	838.9	789.6	196.4	0.0	0.0	6792.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.0	0.1	0.1	77.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.0	0.1	0.1	77.3
LF (%)	104.5	104.6	58.2	53.9	104.1	104.1	104.2	104.4	101.5	24.4	0.0	0.0	71.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	29.2	0.0	0.0	77.3
EUUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.0	99.9	99.9	22.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	71.0	99.9	99.9	22.7
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 03 Jan 1974
 Date of First Criticality: 29/08/1983
 Date of Grid Connection: 25/09/1983
 Date of Commercial Operation: 04 Jan 1984
 Lifetime Generation: 206543.3 GW(e).h
 Cumulative Energy Availability Factor: 82.0%
 Cumulative Load Factor: 80.9%
 Cumulative Unit Capability Factor: 82.0%
 Cumulative Energy Unavailability Factor: 18.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	4112.2	1080	62.9	62.9	62.9	62.9	57.7	57.7	4103	62.2
1985	3735.9	1080	53.8	57.7	53.8	57.7	39.5	47.3	4708	53.7
1986	6760.6	1080	80.7	66.1	80.7	66.1	71.5	56.1	7067	80.7
1987	7523.6	1080	79.8	69.7	79.8	69.7	79.5	62.3	6987	79.8
1988	6146.0	1080	65.1	68.7	65.1	68.7	64.8	62.8	5714	65.1
1989	8840.6	1080	93.9	73.1	93.9	73.1	93.4	68.2	8224	93.9
1990	6602.0	1080	70.3	72.7	70.3	72.7	69.8	68.4	6159	70.3
1991	8693.2	1080	92.4	75.2	92.4	75.2	91.9	71.4	8094	92.4
1992	6830.8	1080	74.4	75.1	74.4	75.1	72.0	71.5	6533	74.4
1993	7128.2	1080	76.4	75.3	76.4	75.3	75.3	71.9	6689	76.4
1994	9147.7	1080	99.8	77.5	99.8	77.5	96.7	74.2	8742	99.8
1995	7501.6	1080	81.9	77.9	81.9	77.9	79.3	74.6	7175	81.9
1996	8838.6	1080	94.6	79.2	94.6	79.2	93.2	76.1	8313	94.6
1997	6842.9	1080	72.6	78.7	72.6	78.7	72.3	75.8	6357	72.6
1998	9058.6	1080	94.8	79.8	94.8	79.8	95.7	77.2	8304	94.8
1999	8416.5	1080	87.4	80.3	87.4	80.3	89.0	77.9	7658	87.4
2000	9633.8	1080	100.0	81.5	100.0	81.5	101.5	79.3	8784	100.0
2001	5679.3	1080	58.9	80.2	58.9	80.2	60.0	78.2	5170	59.0
2002	9548.2	1080	98.8	81.2	98.8	81.2	100.9	79.4	8658	98.8
2003	8596.3	1080	88.4	81.6	88.4	81.6	90.9	80.0	7741	88.4
2004	6985.6	1080	72.8	81.2	72.2	81.1	73.6	79.7	6344	72.2
2005	9468.3	1080	98.4	81.9	98.4	81.9	100.1	80.7	8616	98.3
2006	6827.6	1080	72.0	81.5	72.0	81.5	72.2	80.3	6308	72.0
2007	8905.6	1080	90.9	81.9	90.9	81.9	94.1	80.9	7963	90.9
2008	6541.3	1080	71.7	81.5	71.7	81.5	69.0	80.4	6292	71.6
2009	9834.6	1080	100.0	82.2	100.0	82.2	104.0	81.3	8760	100.0
2010	6792.1	1080	77.3	82.0	77.3	82.0	71.8	80.9	6768	77.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					419	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1991			896		
D. Inspection, maintenance or repair without refuelling				71		
E. Testing of plant systems or components				4		
H. Nuclear regulatory requirements					9	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					5	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)				50		
Subtotal	1991	0	0	1021	434	2
Total		1991			1457	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		32
13. Reactor Auxiliary Systems		6
14. Safety Systems		81
15. Reactor Cooling Systems		60
16. Steam generation systems		50
31. Turbine and auxiliaries		9
32. Feedwater and Main Steam System		10
41. Main Generator Systems		33
42. Electrical Power Supply Systems		33
Total	0	314

US-443 SEABROOK-1

Operator: NEXTERA (NextEra Energy Resources, LLC)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1247.0 MW(e)
Design Net Capacity: 1149.0 MW(e)
Design Discharge Burnup: 33000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10910.1 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 99.9%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	927.7	837.9	926.1	898.1	928.6	898.2	927.5	925.7	894.3	926.1	892.7	927.1	10910.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	100.0	100.0	100.0	100.0	100.1	100.0	100.0	99.8	99.6	99.8	99.3	99.9	99.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jul 1976
Date of First Criticality: 13/06/1989
Date of Grid Connection: 29/05/1990
Date of Commercial Operation: 19/08/1990

Lifetime Generation: 181323.5 GW(e).h
Cumulative Energy Availability Factor: 87.1%
Cumulative Load Factor: 85.9%
Cumulative Unit Capability Factor: 87.2%
Cumulative Energy Unavailability Factor: 12.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1990	3443.5	1151	85.2	85.2	85.2	85.2	81.5	81.5	3131	85.2
1991	6814.4	1150	73.0	76.6	73.0	76.6	67.6	71.7	6394	73.0
1992	7868.4	1150	80.3	78.1	80.3	78.1	77.9	74.3	7056	80.3
1993	9046.8	1150	92.4	82.3	92.4	82.3	89.8	78.8	8094	92.4
1994	6203.5	1150	62.3	77.8	62.3	77.8	61.6	74.9	5466	62.4
1995	8380.6	1150	85.2	79.1	85.2	79.1	83.1	76.4	7465	85.2
1996	9844.2	1158	99.0	82.2	99.0	82.2	96.8	79.6	8690	98.9
1997	7945.7	1158	79.2	81.8	79.2	81.8	78.3	79.5	6929	79.1
1998	8388.4	1158	83.3	82.0	83.3	82.0	82.7	79.8	7294	83.3
1999	8685.7	1156	86.3	82.5	86.3	82.5	85.8	80.5	7564	86.3
2000	7921.5	1155	78.7	82.1	78.7	82.1	78.1	80.2	6910	78.7
2001	8692.2	1155	90.6	82.8	87.9	82.6	85.9	80.7	7703	87.9
2002	9293.4	1155	92.2	83.6	92.2	83.4	91.9	81.6	8083	92.3
2003	9275.4	1155	92.7	84.3	92.7	84.1	91.7	82.4	8121	92.7
2004	10177.0	1155	100.0	85.4	100.0	85.2	100.3	83.6	8784	100.0
2005	9455.2	1159	90.5	85.7	90.5	85.5	93.1	84.2	7928	90.5
2006	9397.4	1224	87.9	85.9	87.9	85.7	87.6	84.5	7718	88.1
2007	10763.9	1245	99.0	86.7	99.0	86.5	98.7	85.3	8669	99.0
2008	9349.6	1245	86.5	86.6	86.5	86.5	85.5	85.3	7596	86.5
2009	8816.7	1245	83.6	86.5	83.6	86.3	80.8	85.1	7326	83.6
2010	10910.1	1247	100.0	87.2	100.0	87.1	99.9	85.9	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1990 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					277	
C. Inspection, maintenance or repair combined with refuelling				800		
D. Inspection, maintenance or repair without refuelling				32	1	
E. Testing of plant systems or components				1	5	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	2	11
Subtotal	0	0	0	833	285	11
Total		0			1129	

7. Equipment Related Full Outages, Analysis by System

System	2010	1990 to 2010
	Hours Lost	Average Hours Lost Per Year
13. Reactor Auxiliary Systems		83
15. Reactor Cooling Systems		40
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		31
32. Feedwater and Main Steam System		17
35. All other I&C Systems		18
41. Main Generator Systems		43
42. Electrical Power Supply Systems		37
Total	0	272

US-327 SEQUOYAH-1

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1152.0 MW(e)
Design Net Capacity: 1148.0 MW(e)
Design Discharge Burnup: 45000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8464.1 GW(e).h
Energy Availability Factor: 86.0%
Load Factor: 83.9%
Operating Factor: 85.9%
Energy Unavailability Factor: 14.0%
Total Off-line Time: 1236 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	866.8	783.7	866.4	834.2	859.0	823.3	838.5	831.2	726.5	1.5	312.6	720.2	8464.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.6	44.5	84.8	86.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.6	44.5	84.8	86.0
LF (%)	101.1	101.2	101.2	100.6	100.2	99.3	97.8	97.0	87.6	0.2	37.6	84.0	83.9
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	44.2	84.7	85.9
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.4	55.5	15.2	14.0
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.4	51.7	0.0	12.4
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	15.2	1.6
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 27/05/1970
Date of First Criticality: 07 May 1980
Date of Grid Connection: 22/07/1980
Date of Commercial Operation: 07 Jan 1981

Lifetime Generation: 209536.6 GW(e).h
Cumulative Energy Availability Factor: 72.3%
Cumulative Load Factor: 70.5%
Cumulative Unit Capability Factor: 72.3%
Cumulative Energy Unavailability Factor: 27.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1981	2526.9	1128	62.1	62.1	62.1	62.1	50.7	50.7	2688	60.9
1982	4909.7	1128	53.4	56.3	53.4	56.3	49.7	50.0	4626	52.8
1983	7340.9	1139	78.2	65.1	78.2	65.1	73.6	59.5	6791	77.5
1984	6104.7	1148	69.1	66.3	69.1	66.3	60.5	59.8	5992	68.2
1985	4076.1	1148	44.7	61.4	44.7	61.4	40.5	55.5	3760	42.9
1986	0.0	1148	0.0	50.2	0.0	50.2	0.0	45.3	0	0.0
1987	0.0	1148	0.0	42.4	0.0	42.4	0.0	38.3	0	0.0
1988	127.7	1148	6.3	37.6	6.3	37.6	1.3	33.4	282	3.2
1989	9550.6	1148	98.5	44.8	98.5	44.8	95.0	40.6	8624	98.4
1990	6840.7	1148	74.0	47.9	74.0	47.9	68.0	43.5	6406	73.1
1991	7270.1	1122	77.6	50.7	77.6	50.7	74.0	46.4	6774	77.3
1992	8402.5	1122	88.2	53.9	88.2	53.9	85.3	49.7	7734	88.0
1993	1290.5	1122	14.8	50.8	14.8	50.8	13.1	46.8	1219	13.9
1994	6111.6	1111	66.0	51.9	66.0	51.9	62.8	48.0	5774	65.9
1995	6829.5	1111	75.6	53.5	75.6	53.5	70.2	49.5	6620	75.6
1996	9293.5	1112	95.1	56.1	95.1	56.1	95.1	52.4	8344	95.0
1997	8324.3	1117	85.5	57.9	85.5	57.9	85.1	54.3	7486	85.5
1998	8905.7	1118	91.0	59.8	91.0	59.8	90.9	56.4	7966	90.9
1999	9987.0	1122	100.0	61.9	100.0	61.9	101.6	58.8	8760	100.0
2000	7720.5	1122	79.5	62.8	79.5	62.8	78.3	59.8	6988	79.6
2001	9019.0	1122	91.2	64.2	91.2	64.2	91.8	61.4	7988	91.2
2002	9953.5	1125	100.0	65.8	100.0	65.8	101.1	63.2	8760	100.0
2003	7351.1	1125	73.6	66.2	73.6	66.2	74.6	63.7	6443	73.6
2004	9290.5	1148	91.4	67.3	91.4	67.3	92.1	64.9	8027	91.4
2005	10076.5	1150	98.8	68.6	98.8	68.6	100.0	66.4	8658	98.8
2006	9086.0	1150	90.4	69.4	90.4	69.4	90.2	67.3	7915	90.4
2007	8758.3	1148	87.5	70.1	87.5	70.1	87.1	68.1	7668	87.5
2008	10164.8	1148	99.5	71.2	99.5	71.2	100.8	69.3	8738	99.5
2009	8962.2	1148	89.3	71.9	89.3	71.9	89.1	70.0	7820	89.3
2010	8464.1	1152	86.0	72.3	86.0	72.3	83.9	70.5	7524	85.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1981 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		27			570	
B. Refuelling without a maintenance					16	
C. Inspection, maintenance or repair combined with refuelling	1094			800		
D. Inspection, maintenance or repair without refuelling				11	24	
E. Testing of plant systems or components				0		
F. Major back-fitting, refurbishment or upgrading activities with refuelling					3	
H. Nuclear regulatory requirements				36	304	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				46	543	
L. Human factor related					3	
P. Fire		113				
Subtotal	1094	140	0	893	1463	0
Total		1234			2356	

7. Equipment Related Full Outages, Analysis by System

System	2010	1981 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		19
13. Reactor Auxiliary Systems		15
14. Safety Systems		13
15. Reactor Cooling Systems		54
16. Steam generation systems	27	4
31. Turbine and auxiliaries		32
32. Feedwater and Main Steam System		292
35. All other I&C Systems		5
41. Main Generator Systems		86
42. Electrical Power Supply Systems		34
Total	27	554

US-328 SEQUOYAH-2

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1126.0 MW(e)
 Design Net Capacity: 1148.0 MW(e)
 Design Discharge Burnup: 45000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9536.7 GW(e).h
 Energy Availability Factor: 97.9%
 Load Factor: 96.7%
 Operating Factor: 97.9%
 Energy Unavailability Factor: 2.1%
 Total Off-line Time: 187 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	852.1	769.6	784.9	797.7	752.0	664.3	817.5	806.0	783.6	832.6	824.3	852.0	9536.7
EAF (%)	100.0	100.0	100.0	100.0	87.1	87.6	100.0	100.0	100.0	100.0	100.0	100.0	97.9
UCF (%)	100.0	100.0	100.0	100.0	87.1	87.6	100.0	100.0	100.0	100.0	100.0	100.0	97.9
LF (%)	101.7	101.7	93.8	98.4	89.8	81.9	97.6	96.2	96.7	99.4	101.5	101.7	96.7
OF (%)	100.0	100.0	100.0	100.0	90.2	84.2	100.0	100.0	100.0	100.0	100.0	100.0	97.9
EUUF (%)	0.0	0.0	0.0	0.0	12.9	12.4	0.0	0.0	0.0	0.0	0.0	0.0	2.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	12.9	12.4	0.0	0.0	0.0	0.0	0.0	0.0	2.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 27/05/1970
 Date of First Criticality: 11 May 1981
 Date of Grid Connection: 23/12/1981
 Date of Commercial Operation: 06 Jan 1982

Lifetime Generation: 209804.7 GW(e).h
 Cumulative Energy Availability Factor: 76.5%
 Cumulative Load Factor: 73.8%
 Cumulative Unit Capability Factor: 76.5%
 Cumulative Energy Unavailability Factor: 23.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1982	3926.3	1145	75.0	75.0	75.0	75.0	66.8	66.8	3804	74.1
1983	6691.4	1133	72.8	73.6	72.8	73.6	67.4	67.2	6346	72.4
1984	6403.3	1148	69.8	72.1	69.8	72.1	63.5	65.7	6112	69.6
1985	5625.0	1148	59.8	68.7	59.8	68.7	55.9	63.0	5223	59.6
1986	0.0	1148	0.0	53.7	0.0	53.7	0.0	49.2	0	0.0
1987	0.0	1148	0.0	44.0	0.0	44.0	0.0	40.4	0	0.0
1988	3934.7	1148	59.4	46.4	59.4	46.4	39.0	40.2	5097	58.0
1989	6067.7	1148	70.7	49.6	70.7	49.6	60.3	42.8	6103	69.7
1990	7185.5	1148	79.1	53.0	79.1	53.0	71.5	46.2	6864	78.4
1991	9318.9	1122	96.9	57.5	96.9	57.5	94.8	51.2	8482	96.8
1992	7276.1	1122	80.3	59.6	80.3	59.6	73.8	53.3	7031	80.0
1993	2094.4	1122	26.3	56.8	26.3	56.8	21.3	50.6	2213	25.3
1994	5849.4	1106	61.8	57.2	61.8	57.2	60.4	51.3	5415	61.8
1995	8887.7	1106	92.1	59.7	92.1	59.7	91.7	54.2	8064	92.1
1996	7682.5	1108	78.6	61.0	78.6	61.0	78.9	55.9	6894	78.5
1997	8725.6	1117	91.5	62.9	91.5	62.9	89.2	58.0	8001	91.3
1998	9799.6	1117	98.8	65.0	98.8	65.0	100.1	60.5	8656	98.8
1999	8979.0	1117	93.7	66.7	93.7	66.7	91.8	62.2	8203	93.6
2000	9058.3	1117	92.9	68.1	92.9	68.1	92.3	63.8	8158	92.9
2001	9939.9	1117	100.0	69.7	100.0	69.7	101.6	65.7	8760	100.0
2002	8542.0	1126	87.3	70.5	87.3	70.5	87.1	66.8	7640	87.2
2003	8258.3	1126	84.6	71.2	84.6	71.2	83.7	67.6	7401	84.5
2004	9464.9	1124	95.1	72.2	95.1	72.2	95.9	68.8	8353	95.1
2005	8922.6	1127	89.8	73.0	89.8	73.0	90.4	69.7	7867	89.8
2006	8914.7	1127	90.6	73.7	90.6	73.7	90.3	70.6	7931	90.5
2007	9892.4	1126	99.2	74.7	99.2	74.7	100.3	71.7	8692	99.2
2008	8752.6	1126	88.2	75.2	88.2	75.2	88.5	72.3	7749	88.2
2009	8792.4	1126	89.5	75.7	89.5	75.7	89.1	73.0	7837	89.5
2010	9536.7	1126	97.9	76.5	97.9	76.5	96.7	73.8	8573	97.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1982 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					463	
B. Refuelling without a maintenance					20	
C. Inspection, maintenance or repair combined with refuelling				709		
D. Inspection, maintenance or repair without refuelling				36		
E. Testing of plant systems or components				1		
H. Nuclear regulatory requirements					411	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					386	
L. Human factor related		185				
Subtotal	0	185	0	746	1280	0
Total		185			2026	

7. Equipment Related Full Outages, Analysis by System

System	2010	1982 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		8
14. Safety Systems		1
15. Reactor Cooling Systems		46
16. Steam generation systems		24
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		25
32. Feedwater and Main Steam System		60
35. All other I&C Systems		2
41. Main Generator Systems		255
42. Electrical Power Supply Systems		21
Total	0	449

US-400 SHEARON HARRIS-1

Operator: PROGRESS (PROGRESS ENERGY)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 900.0 MW(e)
 Design Net Capacity: 900.0 MW(e)
 Design Discharge Burnup: 31500 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7080.6 GW(e).h
 Energy Availability Factor: 88.4%
 Load Factor: 89.8%
 Operating Factor: 88.4%
 Energy Unavailability Factor: 11.6%
 Total Off-line Time: 1014 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	690.3	632.1	696.0	666.1	685.1	654.7	677.2	677.6	653.8	11.9	336.6	699.3	7080.6
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	59.4	100.0	88.4
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	59.4	100.0	88.4
LF (%)	103.1	104.5	104.1	102.8	102.3	101.0	101.1	101.2	100.9	1.8	51.9	104.4	89.8
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	3.2	59.2	100.0	88.4
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	40.6	0.0	11.6
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.8	40.6	0.0	11.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 28/01/1978
 Date of First Criticality: 01 Mar 1987
 Date of Grid Connection: 19/01/1987
 Date of Commercial Operation: 05 Feb 1987

Lifetime Generation: 154198.5 GW(e).h
 Cumulative Energy Availability Factor: 88.1%
 Cumulative Load Factor: 87.3%
 Cumulative Unit Capability Factor: 88.1%
 Cumulative Energy Unavailability Factor: 11.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987			Data not provided							
1988	5345.6	860	73.6	73.6	73.6	73.6	70.8	70.8	6458	73.5
1989	5638.8	860	78.5	76.0	78.5	76.0	74.8	72.8	6873	78.5
1990	6339.0	860	89.2	80.4	89.2	80.4	84.1	76.6	7812	89.2
1991	5927.4	860	80.8	80.5	80.8	80.5	78.7	77.1	7080	80.8
1992	5427.9	860	74.0	79.2	74.0	79.2	71.9	76.1	6501	74.0
1993	7527.7	860	99.6	82.6	99.6	82.6	99.9	80.0	8721	99.6
1994	6065.1	860	82.2	82.5	82.2	82.5	80.5	80.1	7195	82.1
1995	5966.3	860	83.1	82.6	83.1	82.6	79.2	80.0	7279	83.1
1996	7067.7	860	95.3	84.0	94.6	83.9	93.6	81.5	8301	94.5
1997	5909.0	860	79.2	83.5	79.2	83.5	78.4	81.2	6934	79.2
1998	6711.6	860	90.1	84.1	90.1	84.1	89.1	81.9	7891	90.1
1999	7244.1	860	96.9	85.2	96.9	85.1	96.2	83.1	8484	96.8
2000	6878.0	860	92.2	85.7	92.2	85.7	91.0	83.7	8098	92.2
2001	5401.5	860	72.3	84.8	72.3	84.7	71.7	82.8	6335	72.3
2002	7835.0	900	99.0	85.8	98.7	85.7	99.4	84.0	8643	98.7
2003	7236.9	900	92.3	86.2	92.3	86.1	91.8	84.5	8082	92.3
2004	7008.4	900	87.5	86.3	87.5	86.2	88.7	84.8	7687	87.5
2005	7930.8	900	99.4	87.0	99.4	87.0	100.6	85.7	8710	99.4
2006	7029.3	900	88.5	87.1	88.5	87.1	89.2	85.9	7749	88.5
2007	7403.1	900	93.4	87.4	93.4	87.4	93.9	86.3	8176	93.3
2008	7821.4	900	97.2	87.9	97.2	87.9	98.9	86.9	8534	97.2
2009	7403.2	900	92.4	88.1	92.4	88.1	93.9	87.2	8091	92.4
2010	7080.6	900	88.4	88.1	88.4	88.1	89.8	87.3	7746	88.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					163	
B. Refuelling without a maintenance					1	
C. Inspection, maintenance or repair combined with refuelling	1013			767		
D. Inspection, maintenance or repair without refuelling				62	5	
E. Testing of plant systems or components				1		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					2	4
Subtotal	1013	0	0	830	171	4
Total		1013			1005	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		25
15. Reactor Cooling Systems		0
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		70
32. Feedwater and Main Steam System		42
41. Main Generator Systems		14
42. Electrical Power Supply Systems		1
XX. Miscellaneous Systems		5
Total	0	158

US-498 SOUTH TEXAS-1

Operator: STP (STP Nuclear Operating Co.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUF at the beginning of 2010): 1280.0 MW(e)
Design Net Capacity: 1250.0 MW(e)
Design Discharge Burnup: 43000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 11304.1 GW(e).h
Energy Availability Factor: 98.1%
Load Factor: 100.8%
Operating Factor: 98.0%
Energy Unavailability Factor: 1.9%
Total Off-line Time: 172 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	886.7	700.3	1007.6	959.8	981.9	949.5	980.1	909.9	949.8	996.6	971.6	1010.5	11304.1
EAF (%)	100.0	80.0	100.0	100.0	100.0	100.0	100.0	95.1	100.0	100.0	100.0	100.0	98.1
UCF (%)	100.0	80.0	100.0	100.0	100.0	100.0	100.0	95.1	100.0	100.0	100.0	100.0	98.1
LF (%)	93.1	81.4	106.0	104.1	103.1	103.0	102.9	95.5	103.1	104.6	105.3	106.1	100.8
OF (%)	100.0	79.9	100.0	100.0	100.0	100.0	100.0	95.0	100.0	100.0	100.0	100.0	98.0
EUF (%)	0.0	20.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	1.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	20.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	1.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 22/12/1975
Date of First Criticality: 03 Aug 1988
Date of Grid Connection: 30/03/1988
Date of Commercial Operation: 25/08/1988

Lifetime Generation: 200313.9 GW(e).h
Cumulative Energy Availability Factor: 81.7%
Cumulative Load Factor: 81.2%
Cumulative Unit Capability Factor: 81.7%
Cumulative Energy Unavailability Factor: 18.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1988	2791.5	1250	77.7	77.7	77.7	77.7	72.1	72.1	2404	77.6
1989	6307.7	1250	63.1	66.9	63.1	66.9	57.6	61.4	5524	63.1
1990	6072.9	1251	59.4	63.7	59.4	63.7	55.4	58.9	5198	59.3
1991	7239.8	1251	69.3	65.4	69.3	65.4	66.1	61.0	6069	69.3
1992	7265.1	1251	68.7	66.1	68.7	66.1	66.1	62.2	6033	68.7
1993	666.0	1251	7.7	55.2	7.7	55.2	6.1	51.7	676	7.7
1994	8251.4	1251	78.2	58.8	78.2	58.8	75.3	55.4	6842	78.1
1995	9301.8	1251	86.5	62.6	86.5	62.6	84.9	59.4	7570	86.4
1996	10226.8	1251	93.5	66.3	93.5	66.3	93.1	63.5	8213	93.5
1997	9873.2	1251	91.6	69.0	91.6	69.0	90.1	66.3	8019	91.5
1998	10859.9	1250	99.8	72.0	99.8	72.0	99.1	69.5	8739	99.8
1999	9645.4	1250	89.7	73.5	89.7	73.5	88.1	71.1	7857	89.7
2000	8591.9	1250	78.6	74.0	78.6	74.0	78.3	71.7	6905	78.6
2001	10338.2	1250	94.1	75.5	94.1	75.5	94.4	73.4	8240	94.1
2002	10867.9	1250	97.9	77.0	97.9	77.0	99.0	75.2	8573	97.9
2003	6858.8	1250	62.3	76.1	62.3	76.1	62.6	74.4	5433	62.0
2004	11103.6	1250	99.2	77.5	99.2	77.5	101.1	76.0	8712	99.2
2005	9901.9	1280	89.6	78.2	89.6	78.2	88.3	76.7	7845	89.5
2006	10144.5	1280	90.7	78.9	90.7	78.9	90.5	77.5	7942	90.7
2007	11804.8	1280	100.0	80.0	100.0	80.0	105.3	79.0	8760	100.0
2008	10800.6	1280	92.3	80.6	92.3	80.6	96.1	79.8	8108	92.3
2009	10052.2	1280	86.6	80.9	86.6	80.9	89.6	80.3	7582	86.6
2010	11304.1	1280	98.1	81.7	98.1	81.7	100.8	81.2	8588	98.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		134			692	
B. Refuelling without a maintenance					15	
C. Inspection, maintenance or repair combined with refuelling				715		
D. Inspection, maintenance or repair without refuelling				68	44	
E. Testing of plant systems or components				6		
H. Nuclear regulatory requirements					16	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0		
L. Human factor related		36				
Subtotal	0	170	0	789	767	0
Total		170			1556	

7. Equipment Related Full Outages, Analysis by System

System	2010	1988 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems	134	1
13. Reactor Auxiliary Systems		5
14. Safety Systems		405
15. Reactor Cooling Systems		11
17. Safety I&C Systems (excluding reactor I&C)		140
31. Turbine and auxiliaries		17
32. Feedwater and Main Steam System		20
35. All other I&C Systems		7
41. Main Generator Systems		72
42. Electrical Power Supply Systems		5
Total	134	683

US-499 SOUTH TEXAS-2

Operator: STP (STP Nuclear Operating Co.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1280.0 MW(e)
 Design Net Capacity: 1250.0 MW(e)
 Design Discharge Burnup: 43000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9822.7 GW(e).h
 Energy Availability Factor: 84.2%
 Load Factor: 87.6%
 Operating Factor: 84.1%
 Energy Unavailability Factor: 15.8%
 Total Off-line Time: 1389 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	1015.0	916.3	870.4	0.0	912.4	955.9	985.8	979.8	958.3	1003.9	209.1	1015.9	9822.7
EAF (%)	100.0	100.0	83.8	0.0	99.5	100.0	100.0	100.0	100.0	100.0	24.7	100.0	84.2
UCF (%)	100.0	100.0	83.9	0.0	99.5	100.0	100.0	100.0	100.0	100.0	24.7	100.0	84.2
LF (%)	106.6	106.5	91.5	0.0	95.8	103.7	103.5	102.9	104.0	105.4	22.7	106.7	87.6
OF (%)	100.0	100.0	86.9	0.0	96.2	100.0	100.0	100.0	100.0	100.0	24.5	100.0	84.1
EUf (%)	0.0	0.0	16.2	100.0	0.5	0.0	0.0	0.0	0.0	0.0	75.3	0.0	15.8
PUf (%)	0.0	0.0	16.2	100.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.3	0.0	6.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 22/12/1975
 Date of First Criticality: 03 Dec 1989
 Date of Grid Connection: 04 Nov 1989
 Date of Commercial Operation: 19/06/1989
 Lifetime Generation: 194864.6 GW(e).h
 Cumulative Energy Availability Factor: 82.7%
 Cumulative Load Factor: 82.0%
 Cumulative Unit Capability Factor: 82.7%
 Cumulative Energy Unavailability Factor: 17.3%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	3026.7	1250	60.5	60.5	60.5	60.5	51.5	51.5	2845	60.5
1990	6452.2	1251	62.8	62.0	62.8	62.0	58.9	56.3	5494	62.7
1991	7268.0	1251	70.0	65.2	70.0	65.2	66.3	60.2	6134	70.0
1992	10341.0	1251	97.3	74.3	97.3	74.3	94.1	69.8	8548	97.3
1993	690.3	1251	8.0	59.7	8.0	59.7	6.3	55.8	702	8.0
1994	5991.0	1251	58.2	59.4	58.2	59.4	54.7	55.6	5098	58.2
1995	9923.1	1251	91.2	64.3	91.2	64.3	90.5	61.0	7985	91.2
1996	10457.9	1251	95.3	68.4	95.3	68.4	95.2	65.5	8373	95.3
1997	9972.9	1251	92.4	71.2	92.4	71.2	91.0	68.5	8093	92.4
1998	9983.9	1250	92.5	73.4	92.5	73.4	91.1	70.9	8096	92.4
1999	9799.3	1250	91.7	75.2	91.7	75.2	89.5	72.6	8034	91.7
2000	10557.2	1250	96.2	77.0	96.2	77.0	96.1	74.7	8449	96.2
2001	9537.6	1250	88.5	77.9	88.5	77.9	87.1	75.7	7751	88.5
2002	8219.8	1250	75.9	77.8	75.9	77.8	75.1	75.6	6663	76.1
2003	8920.2	1250	81.1	78.0	81.1	78.0	81.5	76.0	7112	81.2
2004	10304.1	1250	92.3	78.9	92.3	78.9	93.8	77.2	8121	92.5
2005	9937.2	1280	89.8	79.6	89.8	79.6	88.6	77.9	7866	89.8
2006	11226.0	1280	100.0	80.8	100.0	80.8	100.1	79.2	8760	100.0
2007	10373.7	1280	90.7	81.3	90.7	81.3	92.5	79.9	7943	90.7
2008	10739.1	1280	91.6	81.9	91.6	81.9	95.5	80.7	8047	91.6
2009	11303.9	1280	97.0	82.6	97.0	82.6	100.8	81.7	8498	97.0
2010	9822.7	1280	84.2	82.7	84.2	82.7	87.6	82.0	7371	84.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010		
	Planned	Unplanned	External	Average Hours Lost Per Year		
				Planned	Unplanned	External
A. Plant equipment problem/failure		543			485	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling	844			834		
D. Inspection, maintenance or repair without refuelling				85		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)						6
Z. Others						1
Subtotal	844	543	0	921	502	0
Total		1387			1423	

7. Equipment Related Full Outages, Analysis by System

System	2010	1989 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		2
13. Reactor Auxiliary Systems		10
14. Safety Systems		183
15. Reactor Cooling Systems		8
16. Steam generation systems		14
17. Safety I&C Systems (excluding reactor I&C)		6
31. Turbine and auxiliaries		95
32. Feedwater and Main Steam System		44
33. Circulating Water System		1
35. All other I&C Systems		8
41. Main Generator Systems		40
42. Electrical Power Supply Systems	543	41
Total	543	452

US-335 ST. LUCIE-1

Operator: FPL (FLORIDA POWER & LIGHT CO.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 839.0 MW(e)
 Design Net Capacity: 830.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5302.7 GW(e).h
 Energy Availability Factor: 77.8%
 Load Factor: 72.1%
 Operating Factor: 77.8%
 Energy Unavailability Factor: 22.2%
 Total Off-line Time: 1947 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	641.9	580.5	588.7	44.9	0.0	33.1	488.4	468.0	563.3	633.1	618.7	642.1	5302.7
EAF (%)	100.0	100.0	100.0	10.0	0.0	23.1	100.0	100.0	100.0	100.0	100.0	100.0	77.8
UCF (%)	100.0	100.0	100.0	10.0	0.0	23.1	100.0	100.0	100.0	100.0	100.0	100.0	77.8
LF (%)	102.8	103.0	94.4	7.4	0.0	5.5	78.2	75.0	93.2	101.4	102.3	102.9	72.1
OF (%)	100.0	100.0	100.0	12.1	0.0	20.8	100.0	100.0	100.0	100.0	100.0	100.0	77.8
EUF (%)	0.0	0.0	0.0	90.0	100.0	76.9	0.0	0.0	0.0	0.0	0.0	0.0	22.2
PUF (%)	0.0	0.0	0.0	90.0	100.0	41.3	0.0	0.0	0.0	0.0	0.0	0.0	19.3
UCLF (%)	0.0	0.0	0.0	0.0	0.0	35.7	0.0	0.0	0.0	0.0	0.0	0.0	2.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 07 Jan 1970
 Date of First Criticality: 22/04/1976
 Date of Grid Connection: 05 Jul 1976
 Date of Commercial Operation: 21/12/1976
 Lifetime Generation: 202881.8 GW(e).h
 Cumulative Energy Availability Factor: 82.3%
 Cumulative Load Factor: 82.0%
 Cumulative Unit Capability Factor: 82.5%
 Cumulative Energy Unavailability Factor: 17.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1976	99.0	814	100.0	100.0	100.0	100.0	16.6	16.6	264	35.5
1977	5343.7	779	78.4	80.1	78.4	80.1	78.3	73.3	7414	84.6
1978	5009.7	777	73.7	77.0	73.7	77.0	73.6	73.5	6674	76.2
1979	4889.6	777	71.7	75.3	71.7	75.3	71.8	72.9	6469	73.8
1980	5201.9	777	76.0	75.5	76.0	75.5	76.2	73.7	6797	77.4
1981	4954.7	777	70.5	74.5	70.5	74.5	72.8	73.6	6364	72.6
1982	6784.6	803	94.1	77.8	94.1	77.8	96.5	77.4	8227	93.9
1983	1099.5	820	15.4	68.6	15.4	68.6	15.3	68.3	1350	15.4
1984	4243.3	822	60.8	67.6	58.6	67.3	58.8	67.1	5154	58.7
1985	5868.6	825	80.4	69.1	80.4	68.8	81.1	68.7	7067	80.7
1986	7052.0	829	95.7	71.8	95.7	71.6	97.1	71.6	8351	95.3
1987	5719.2	839	77.8	72.4	77.8	72.2	77.8	72.2	6812	77.8
1988	6256.0	839	84.4	73.4	84.4	73.2	84.9	73.3	7407	84.3
1989	6947.3	839	94.3	75.1	94.3	74.9	94.5	75.0	8257	94.3
1990	4503.5	839	64.3	74.3	64.3	74.1	61.3	74.0	5463	62.4
1991	5793.3	839	80.9	74.7	80.9	74.6	78.8	74.3	7089	80.9
1992	7142.2	839	96.5	76.1	96.5	76.0	96.9	75.7	8479	96.5
1993	5440.5	839	76.6	76.2	76.2	76.0	74.0	75.6	6678	76.2
1994	6183.6	839	86.8	76.8	86.8	76.6	84.1	76.1	7600	86.8
1995	5519.4	839	76.2	76.7	76.2	76.6	75.1	76.1	6662	76.1
1996	5222.0	839	73.8	76.6	73.8	76.5	70.9	75.8	6472	73.7
1997	5717.7	839	78.1	76.7	78.1	76.5	77.8	75.9	6842	78.1
1998	7035.5	839	95.8	77.5	95.8	77.4	95.7	76.8	8393	95.8
1999	6532.7	839	89.9	78.1	88.5	77.9	88.9	77.3	7752	88.5
2000	7513.7	839	100.0	79.0	100.0	78.9	102.0	78.4	8784	100.0
2001	6709.8	839	90.4	79.5	90.4	79.3	91.3	78.9	7915	90.4
2002	6919.4	839	93.2	80.0	93.2	79.9	94.1	79.5	8163	93.2
2003	7504.8	839	100.0	80.8	100.0	80.6	102.1	80.4	8760	100.0
2004	6324.3	839	90.4	81.1	85.6	80.8	85.8	80.6	7518	85.6
2005	6088.1	839	82.4	81.2	82.4	80.9	82.8	80.6	7217	82.4
2006	7463.3	839	100.0	81.8	100.0	81.5	101.5	81.3	8760	100.0
2007	6235.8	839	84.7	81.9	84.7	81.6	84.8	81.5	7417	84.7
2008	6673.0	839	89.6	82.1	89.6	81.9	90.5	81.7	7872	89.6
2009	7369.2	839	100.0	82.7	100.0	82.4	100.3	82.3	8760	100.0
2010	5302.7	839	77.8	82.5	77.8	82.3	72.1	82.0	6813	77.8

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1976 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		256		0	342	
B. Refuelling without a maintenance					21	
C. Inspection, maintenance or repair combined with refuelling	1689			1047		
D. Inspection, maintenance or repair without refuelling				75	6	
E. Testing of plant systems or components				3		
H. Nuclear regulatory requirements				6		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	8	12
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						12
Subtotal	1689	256	0	1131	377	24
Total		1945			1532	

7. Equipment Related Full Outages, Analysis by System

System	2010	1976 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		27
12. Reactor I&C Systems	256	7
13. Reactor Auxiliary Systems		14
14. Safety Systems		5
15. Reactor Cooling Systems		100
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		8
32. Feedwater and Main Steam System		12
33. Circulating Water System		3
41. Main Generator Systems		13
42. Electrical Power Supply Systems		20
XX. Miscellaneous Systems		13
Total	256	223

US-389 ST. LUCIE-2

Operator: FPL (FLORIDA POWER & LIGHT CO.)
 Contractor: CE (COMBUSTION ENGINEERING CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 839.0 MW(e)
 Design Net Capacity: 830.0 MW(e)
 Design Discharge Burnup: 36000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 7331.3 GW(e).h
 Energy Availability Factor: 98.1%
 Load Factor: 99.7%
 Operating Factor: 98.0%
 Energy Unavailability Factor: 1.9%
 Total Off-line Time: 171 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	626.1	582.7	644.2	461.9	636.9	615.4	627.0	639.5	599.7	635.8	618.6	643.3	7331.3
EAF (%)	100.0	100.0	100.0	76.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1
UCF (%)	100.0	100.0	100.0	76.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.1
LF (%)	100.3	103.3	103.3	76.5	102.0	101.9	100.5	102.5	99.3	101.9	102.3	103.1	99.7
OF (%)	100.0	100.0	100.0	76.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.0
EUf (%)	0.0	0.0	0.0	23.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	23.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 06 Feb 1977
 Date of First Criticality: 06 Feb 1983
 Date of Grid Connection: 13/06/1983
 Date of Commercial Operation: 08 Aug 1983
 Lifetime Generation: 171880.7 GW(e).h
 Cumulative Energy Availability Factor: 86.2%
 Cumulative Load Factor: 85.5%
 Cumulative Unit Capability Factor: 86.6%
 Cumulative Energy Unavailability Factor: 13.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	2397.5	808	89.4	89.4	89.4	89.4	87.0	87.0	3129	89.3
1984	5564.8	786	82.9	84.7	79.5	82.3	80.6	82.4	7067	80.5
1985	6108.6	824	83.9	84.4	83.9	83.0	84.6	83.4	7368	84.1
1986	6151.2	837	82.8	83.9	82.8	82.9	83.9	83.5	7253	82.8
1987	5950.2	839	82.3	83.5	82.3	82.8	81.0	82.9	7206	82.3
1988	7407.1	839	100.0	86.6	100.0	86.0	100.5	86.2	8784	100.0
1989	5443.4	839	74.6	84.7	74.6	84.2	74.1	84.3	6531	74.6
1990	5341.5	839	74.1	83.3	74.1	82.8	72.7	82.7	6487	74.1
1991	7428.7	839	100.0	85.3	100.0	84.9	101.1	84.9	8760	100.0
1992	5431.2	839	75.1	84.2	75.1	83.9	73.7	83.7	6598	75.1
1993	4719.9	839	76.4	83.4	76.4	83.1	64.2	81.8	6687	76.3
1994	5607.4	839	79.6	83.1	79.6	82.8	76.3	81.3	6971	79.6
1995	5295.9	839	75.0	82.4	75.0	82.2	72.1	80.6	6570	75.0
1996	6984.8	839	96.2	83.5	96.2	83.2	94.8	81.7	8444	96.1
1997	6498.9	839	88.6	83.8	88.6	83.6	88.4	82.1	7756	88.5
1998	6739.5	839	91.4	84.3	91.4	84.1	91.7	82.7	8009	91.4
1999	7213.0	839	98.0	85.2	98.0	85.0	98.1	83.7	8583	98.0
2000	6804.3	839	91.6	85.5	91.6	85.4	92.3	84.2	8041	91.5
2001	6707.5	839	91.1	85.8	91.1	85.7	91.3	84.6	7979	91.1
2002	7425.0	839	99.8	86.6	99.8	86.4	101.0	85.4	8742	99.8
2003	5891.3	839	81.3	86.3	81.3	86.1	80.2	85.2	7120	81.3
2004	6781.4	839	98.2	86.9	91.8	86.4	92.0	85.5	8059	91.7
2005	6283.1	839	87.9	86.9	86.8	86.4	85.5	85.5	7602	86.8
2006	6048.2	839	84.9	86.8	84.9	86.4	82.3	85.4	7434	84.9
2007	5170.5	839	71.2	86.2	71.2	85.7	70.3	84.7	6232	71.1
2008	7087.3	839	95.2	86.5	95.2	86.1	96.2	85.2	8361	95.2
2009	5906.5	839	76.7	86.2	76.7	85.8	80.4	85.0	6721	76.7
2010	7331.3	839	98.1	86.6	98.1	86.2	99.7	85.5	8589	98.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		170			285	
B. Refuelling without a maintenance					3	
C. Inspection, maintenance or repair combined with refuelling				786		
D. Inspection, maintenance or repair without refuelling				44	15	
E. Testing of plant systems or components				2	0	
H. Nuclear regulatory requirements				0		1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	21	8
L. Human factor related					2	
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						23
Subtotal	0	170	0	832	326	32
Total		170			1190	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		27
14. Safety Systems		12
15. Reactor Cooling Systems		138
17. Safety I&C Systems (excluding reactor I&C)		3
31. Turbine and auxiliaries		40
32. Feedwater and Main Steam System	170	43
33. Circulating Water System		1
41. Main Generator Systems		15
42. Electrical Power Supply Systems		2
Total	170	281

US-280 SURRY-1

Operator: DOMINION (DOMINION GENERATION)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 799.0 MW(e)
 Design Net Capacity: 788.0 MW(e)
 Design Discharge Burnup: 48000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6206.4 GW(e).h
 Energy Availability Factor: 88.3%
 Load Factor: 88.3%
 Operating Factor: 88.2%
 Energy Unavailability Factor: 11.7%
 Total Off-line Time: 1036 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	601.4	543.6	601.1	582.3	598.9	499.3	590.6	592.9	575.9	419.9	0.0	600.5	6206.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	88.4	100.0	100.0	100.0	74.2	0.1	95.1	88.3
UCF (%)	100.0	100.0	100.0	100.0	100.0	88.4	100.0	100.0	100.0	74.2	0.1	95.1	88.3
LF (%)	101.2	101.2	101.3	101.2	100.7	86.8	99.4	99.7	100.1	70.6	0.0	96.2	88.3
OF (%)	100.0	100.0	100.0	100.0	100.0	88.3	100.0	100.0	100.0	74.2	0.0	94.8	88.2
EUF (%)	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	25.8	99.9	4.9	11.7
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.8	99.9	4.9	10.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.9
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/06/1968
 Date of First Criticality: 07 Jan 1972
 Date of Grid Connection: 07 Apr 1972
 Date of Commercial Operation: 22/12/1972
 Lifetime Generation: 194779.3 GW(e).h
 Cumulative Energy Availability Factor: 75.6%
 Cumulative Load Factor: 73.9%
 Cumulative Unit Capability Factor: 75.6%
 Cumulative Energy Unavailability Factor: 24.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	280.7	794	100.0	100.0	100.0	100.0	47.9	47.9	496	66.7
1973	3479.7	788	61.9	64.9	61.9	64.9	50.4	50.2	5377	61.4
1974	3318.1	788	54.8	60.0	54.8	60.0	48.1	49.2	4800	54.8
1975	3858.4	788	56.1	58.8	56.1	58.8	56.0	51.4	5343	61.2
1976	4396.8	788	63.6	59.9	63.6	59.9	63.5	54.4	6010	68.4
1977	5023.9	776	74.0	62.7	74.0	62.7	73.9	58.2	6661	76.0
1978	4704.2	775	69.3	63.8	69.3	63.8	69.3	60.0	6291	71.8
1979	2255.1	775	33.2	59.5	33.2	59.5	33.2	56.2	3045	34.8
1980	2472.6	775	42.2	57.4	42.2	57.4	36.3	53.8	3762	42.8
1981	2377.4	775	39.0	55.4	39.0	55.4	35.0	51.7	3403	38.8
1982	5483.1	775	89.2	58.7	89.2	58.7	80.8	54.6	7776	88.8
1983	3517.1	775	56.4	58.5	56.3	58.5	51.8	54.3	5010	57.2
1984	3334.1	775	58.1	58.5	58.1	58.4	49.0	53.9	5138	58.5
1985	5618.3	779	89.3	60.8	89.3	60.8	82.3	56.1	7827	89.3
1986	4488.6	781	68.1	61.3	68.1	61.3	65.6	56.7	6013	68.6
1987	4633.4	781	70.1	61.9	70.1	61.9	67.7	57.5	6113	69.8
1988	2685.0	781	18.7	59.2	18.7	59.2	39.1	56.3	3632	41.3
1989	3170.5	781	46.8	58.5	46.8	58.5	46.3	55.7	4217	48.1
1990	4772.2	781	74.9	59.4	74.9	59.4	69.8	56.5	6655	76.0
1991	6590.9	781	100.0	61.5	100.0	61.5	96.3	58.6	8760	100.0
1992	5223.8	781	79.6	62.4	79.6	62.4	76.1	59.5	7033	80.1
1993	6229.2	781	95.9	64.0	95.9	64.0	91.1	61.0	8402	95.9
1994	4881.9	781	74.3	64.5	74.3	64.5	71.4	61.5	6560	74.9
1995	5747.0	784	85.4	65.4	85.4	65.4	83.6	62.4	7505	85.7
1996	7137.8	801	100.0	66.9	100.0	66.9	101.4	64.1	8784	100.0
1997	5640.5	801	80.7	67.4	80.7	67.4	80.4	64.8	7067	80.7
1998	5752.4	801	81.9	68.0	81.9	68.0	82.0	65.4	7170	81.8
1999	7116.2	801	100.0	69.2	100.0	69.2	101.4	66.8	8760	100.0
2000	6548.4	801	93.2	70.1	93.2	70.1	93.1	67.7	8188	93.2
2001	5941.6	810	84.3	70.6	84.3	70.6	83.7	68.3	7380	84.2
2002	7149.5	810	100.0	71.6	100.0	71.6	100.8	69.4	8760	100.0
2003	5419.8	810	77.0	71.8	77.0	71.8	76.4	69.7	6741	77.0
2004	6457.1	810	90.5	72.4	90.5	72.4	90.8	70.3	7943	90.4
2005	6746.6	810	95.6	73.1	95.6	73.1	95.1	71.1	8376	95.6
2006	6311.0	799	90.6	73.6	90.6	73.6	90.2	71.7	7931	90.5
2007	6195.2	799	88.1	74.0	88.1	74.0	88.5	72.2	7720	88.1
2008	6890.5	799	97.5	74.7	97.5	74.7	98.2	72.9	8560	97.4
2009	6597.3	799	93.8	75.2	93.8	75.2	94.3	73.5	8214	93.8
2010	6206.4	839	88.3	75.6	88.3	75.6	88.3	73.9	7724	88.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		83		0	538	
B. Refuelling without a maintenance					18	
C. Inspection, maintenance or repair combined with refuelling	950			825		
D. Inspection, maintenance or repair without refuelling				400	1	
E. Testing of plant systems or components				1	0	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements					54	138
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				0	116	0
Subtotal	950	83	0	1226	727	138
Total		1033			2091	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		0
12. Reactor I&C Systems		27
13. Reactor Auxiliary Systems		6
14. Safety Systems		5
15. Reactor Cooling Systems		190
16. Steam generation systems		55
17. Safety I&C Systems (excluding reactor I&C)		2
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		88
41. Main Generator Systems		7
42. Electrical Power Supply Systems	83	83
XX. Miscellaneous Systems		5
Total	83	488

US-281 SURRY-2

Operator: DOMINION (DOMINION GENERATION)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP) at the beginning of 2010: 799.0 MW(e)
Design Net Capacity: 788.0 MW(e)
Design Discharge Burnup: 48000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6966.0 GW(e).h
Energy Availability Factor: 98.7%
Load Factor: 99.5%
Operating Factor: 98.7%
Energy Unavailability Factor: 1.3%
Total Off-line Time: 114 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	605.7	546.7	605.2	585.2	601.1	574.7	495.6	589.1	576.7	600.1	583.7	602.1	6966.0
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	84.7	100.0	100.0	100.0	100.0	100.0	98.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	84.7	100.0	100.0	100.0	100.0	100.0	98.7
LF (%)	101.9	101.8	101.9	101.7	101.1	99.9	83.4	99.1	100.2	101.0	101.3	101.3	99.5
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	84.7	100.0	100.0	100.0	100.0	100.0	98.7
EUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	1.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	15.3	0.0	0.0	0.0	0.0	0.0	1.3
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 25/06/1968
Date of First Criticality: 03 Jul 1973
Date of Grid Connection: 03 Oct 1973
Date of Commercial Operation: 05 Jan 1973
Lifetime Generation: 195234.7 GW(e).h
Cumulative Energy Availability Factor: 76.5%
Cumulative Load Factor: 74.7%
Cumulative Unit Capability Factor: 76.6%
Cumulative Energy Unavailability Factor: 23.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973	3064.7	790	77.9	77.9	77.9	77.9	66.1	66.1	4533	77.1
1974	2660.5	788	44.0	57.6	44.0	57.6	38.5	49.6	3854	44.0
1975	5053.1	788	73.3	63.5	73.3	63.5	73.2	58.5	6967	79.5
1976	3343.4	788	48.3	59.3	48.3	59.3	48.3	55.7	4585	52.2
1977	4457.3	776	65.6	60.7	65.6	60.7	65.6	57.8	5980	68.3
1978	5372.0	775	79.1	63.9	79.1	63.9	79.1	61.5	7244	82.7
1979	611.5	775	9.0	55.7	9.0	55.7	9.0	53.7	818	9.3
1980	2241.6	775	36.0	53.2	36.0	53.2	32.9	51.0	3139	35.7
1981	5150.3	775	82.4	56.5	79.6	56.2	75.9	53.9	6972	79.6
1982	5492.2	775	88.7	59.8	88.7	59.5	80.9	56.6	7729	88.2
1983	4086.1	775	65.0	60.3	65.0	60.0	60.2	57.0	5729	65.4
1984	5209.4	775	83.3	62.3	83.3	62.0	76.5	58.6	7327	83.4
1985	4072.4	775	65.8	62.5	65.8	62.3	60.0	58.7	5857	66.9
1986	4498.9	780	68.7	63.0	68.7	62.8	65.8	59.3	6072	69.3
1987	4791.0	781	73.6	63.7	73.6	63.5	70.0	60.0	6456	73.7
1988	3570.9	781	56.6	63.3	56.6	63.1	52.1	59.5	4993	56.8
1989	893.6	781	13.3	60.3	13.3	60.1	13.1	56.7	1355	15.5
1990	5837.8	781	84.8	61.6	84.8	61.5	85.3	58.3	7919	90.4
1991	3985.2	781	66.6	61.9	66.6	61.8	58.3	58.3	5886	67.2
1992	6426.5	781	96.3	63.7	96.3	63.5	93.7	60.1	8470	96.4
1993	4541.7	781	71.0	64.0	71.0	63.9	66.4	60.4	6283	71.7
1994	6261.0	781	94.1	65.4	94.1	65.3	91.5	61.9	8251	94.2
1995	5517.4	787	80.6	66.1	80.6	66.0	80.0	62.7	7087	80.9
1996	6081.5	801	85.9	66.9	85.9	66.8	86.4	63.7	7539	85.8
1997	6451.3	801	91.7	68.0	91.7	67.9	91.9	64.9	8034	91.7
1998	7178.9	801	100.0	69.3	100.0	69.1	102.3	66.4	8760	100.0
1999	5874.8	801	85.6	69.9	85.6	69.8	83.7	67.0	7493	85.5
2000	6539.4	801	91.3	70.7	91.3	70.6	92.9	68.0	8022	91.3
2001	6720.7	815	93.7	71.5	93.7	71.4	94.1	68.9	8203	93.6
2002	6523.7	815	91.0	72.2	91.0	72.1	91.4	69.7	7966	90.9
2003	5612.1	815	78.3	72.4	78.3	72.3	78.6	70.0	6861	78.3
2004	7051.7	815	98.0	73.2	98.0	73.1	98.5	70.9	8606	98.0
2005	6488.5	815	91.9	73.8	91.9	73.7	90.9	71.6	8046	91.8
2006	6189.4	799	88.0	74.2	88.0	74.2	88.4	72.1	7705	88.0
2007	7086.3	799	100.0	75.0	100.0	74.9	101.2	72.9	8760	100.0
2008	6606.8	799	93.4	75.5	93.4	75.4	94.1	73.5	8205	93.4
2009	6412.3	799	91.6	76.0	91.6	75.9	91.6	74.0	8026	91.6
2010	6966.0	799	98.7	76.6	98.7	76.5	99.5	74.7	8646	98.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1973 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		113			520	
B. Refuelling without a maintenance					18	
C. Inspection, maintenance or repair combined with refuelling				1207	0	
D. Inspection, maintenance or repair without refuelling				224		
E. Testing of plant systems or components				0		
F. Major back-fitting, refurbishment or upgrading activities with refuelling				0		
H. Nuclear regulatory requirements					17	6
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				5	0	
Subtotal	0	113	0	1436	555	6
Total		113			1997	

7. Equipment Related Full Outages, Analysis by System

System	2010	1973 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		24
13. Reactor Auxiliary Systems		4
14. Safety Systems		65
15. Reactor Cooling Systems		13
16. Steam generation systems		130
31. Turbine and auxiliaries		111
32. Feedwater and Main Steam System		116
33. Circulating Water System	113	
35. All other I&C Systems		1
41. Main Generator Systems		5
42. Electrical Power Supply Systems		24
XX. Miscellaneous Systems		3
Total	113	496

US-387 SUSQUEHANNA-1

Operator: PPL_SUSQ (PPL Susquehanna, LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1185.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 36000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8294.4 GW(e).h
 Energy Availability Factor: 80.0%
 Load Factor: 77.8%
 Operating Factor: 79.4%
 Energy Unavailability Factor: 20.0%
 Total Off-line Time: 1802 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	900.7	746.0	24.8	43.7	684.5	892.1	459.0	808.3	916.3	937.5	925.3	956.1	8294.4
EAF (%)	100.0	100.0	3.1	21.8	90.5	100.0	50.6	92.2	100.0	100.0	100.0	100.0	80.0
UCF (%)	100.0	100.0	3.1	21.8	90.5	100.0	50.6	92.2	100.0	100.0	100.0	100.0	80.0
LF (%)	102.2	93.7	2.8	5.1	77.6	100.0	49.8	87.7	102.7	101.7	103.6	103.7	77.8
OF (%)	100.0	100.0	3.5	21.3	90.5	100.0	50.5	89.4	100.0	100.0	100.0	100.0	79.4
EUf (%)	0.0	0.0	96.9	78.2	9.5	0.0	49.4	7.8	0.0	0.0	0.0	0.0	20.0
PUF (%)	0.0	0.0	96.9	69.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5
UCLF (%)	0.0	0.0	0.0	9.2	9.5	0.0	49.4	7.8	0.0	0.0	0.0	0.0	6.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Feb 1973
 Date of First Criticality: 09 Oct 1982
 Date of Grid Connection: 16/11/1982
 Date of Commercial Operation: 06 Aug 1983

Lifetime Generation: 217394.0 GW(e).h
 Cumulative Energy Availability Factor: 84.1%
 Cumulative Load Factor: 82.5%
 Cumulative Unit Capability Factor: 84.1%
 Cumulative Energy Unavailability Factor: 15.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1983	3536.4	1034	76.3	76.3	76.3	76.3	66.6	66.6	3766	73.3
1984	6088.1	1032	74.4	75.1	72.0	73.6	67.2	66.9	6377	72.6
1985	5286.4	1032	60.4	69.4	60.4	68.5	58.5	63.7	5469	62.4
1986	5839.2	1032	66.8	68.7	66.8	68.0	64.6	63.9	5992	68.4
1987	6132.9	1032	70.7	69.1	70.7	68.6	67.8	64.8	6331	72.3
1988	8410.1	1032	93.1	73.4	93.1	73.0	92.8	69.8	8206	93.4
1989	6483.9	1032	72.1	73.2	72.1	72.9	71.7	70.1	6447	73.6
1990	6446.7	1033	73.1	73.2	73.1	72.9	71.2	70.2	6528	74.5
1991	8821.6	1035	98.0	76.1	98.0	75.8	97.2	73.4	8596	98.1
1992	6400.3	1040	73.6	75.9	73.6	75.6	70.1	73.0	6568	74.8
1993	5232.4	1040	57.5	74.1	57.5	73.9	57.4	71.6	5205	59.4
1994	8414.5	1040	94.2	75.9	94.2	75.6	92.4	73.4	8249	94.2
1995	7432.3	1073	81.1	76.3	81.1	76.1	79.0	73.8	7126	81.3
1996	7752.9	1090	84.7	76.9	84.7	76.8	81.0	74.4	7434	84.6
1997	9085.3	1090	94.5	78.2	94.5	78.0	95.2	75.9	8274	94.5
1998	7652.8	1090	81.5	78.4	81.5	78.3	80.1	76.2	7015	80.1
1999	8814.5	1090	94.0	79.4	94.0	79.2	92.3	77.2	8234	94.0
2000	8180.6	1090	86.5	79.8	86.5	79.7	85.4	77.6	7598	86.5
2001	9413.0	1090	99.5	80.9	99.5	80.8	98.6	78.8	8718	99.5
2002	8026.6	1105	85.7	81.2	85.7	81.0	83.4	79.1	7493	85.5
2003	9359.9	1105	98.0	82.0	98.0	81.9	96.7	79.9	8585	98.0
2004	8027.0	1135	84.1	82.1	84.1	82.0	81.2	80.0	7359	83.8
2005	9442.6	1105	95.4	82.7	95.4	82.6	97.5	80.8	8357	95.4
2006	8602.7	1135	87.2	82.9	87.2	82.8	86.5	81.1	7639	87.2
2007	9456.3	1149	95.4	83.5	95.4	83.4	94.0	81.6	8349	95.3
2008	9005.7	1149	87.7	83.6	87.7	83.6	89.2	82.0	7704	87.7
2009	10475.5	1185	100.0	84.3	100.0	84.2	100.9	82.7	8760	100.0
2010	8294.4	1239	80.0	84.1	80.0	84.1	77.8	82.5	6958	79.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		445			234	
B. Refuelling without a maintenance					22	
C. Inspection, maintenance or repair combined with refuelling	1217			827		
D. Inspection, maintenance or repair without refuelling				73	16	
E. Testing of plant systems or components				57		
H. Nuclear regulatory requirements						26
J. Grid limitation, failure or grid unavailability						7
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				69	36	
L. Human factor related		136				
S. Fuel management limitation (including high flux tilt, stretch out or coast-down operation)				14		
Subtotal	1217	581	0	1040	308	33
Total		1798			1381	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		12
13. Reactor Auxiliary Systems		1
14. Safety Systems		16
15. Reactor Cooling Systems		35
17. Safety I&C Systems (excluding reactor I&C)		8
31. Turbine and auxiliaries		76
32. Feedwater and Main Steam System		14
33. Circulating Water System	445	0
35. All other I&C Systems		3
41. Main Generator Systems		14
42. Electrical Power Supply Systems		19
XX. Miscellaneous Systems		25
Total	445	223

US-388 SUSQUEHANNA-2

Operator: PPL_SUSQ (PPL Susquehanna, LLC)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1190.0 MW(e)
 Design Net Capacity: 1065.0 MW(e)
 Design Discharge Burnup: 36000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10221.2 GW(e).h
 Energy Availability Factor: 99.2%
 Load Factor: 98.1%
 Operating Factor: 99.2%
 Energy Unavailability Factor: 0.8%
 Total Off-line Time: 74 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	906.3	819.1	894.4	646.7	881.0	837.8	857.9	869.3	845.1	887.4	870.9	905.3	10221.2
EAF (%)	100.0	100.0	100.0	90.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2
UCF (%)	100.0	100.0	100.0	90.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2
LF (%)	102.4	102.4	101.2	75.5	99.5	97.8	96.9	98.2	98.6	100.2	101.5	102.2	98.1
OF (%)	100.0	100.0	100.0	89.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.2
EUUF (%)	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
PUF (%)	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 11 Feb 1973
 Date of First Criticality: 05 Aug 1984
 Date of Grid Connection: 07 Mar 1984
 Date of Commercial Operation: 02 Dec 1985

Lifetime Generation: 216509.9 GW(e).h
 Cumulative Energy Availability Factor: 88.1%
 Cumulative Load Factor: 86.9%
 Cumulative Unit Capability Factor: 88.1%
 Cumulative Energy Unavailability Factor: 11.9%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	6954.3	1032	90.6	90.6	90.2	90.2	84.1	84.1	6993	87.2
1986	5458.4	1032	63.5	76.5	63.5	76.3	60.4	71.7	5730	65.4
1987	8598.4	1032	96.0	83.2	96.0	83.0	95.1	79.7	8431	96.2
1988	5915.2	1034	66.3	78.9	66.3	78.8	65.1	76.0	5985	68.1
1989	6777.0	1038	76.9	78.5	76.9	78.4	74.5	75.7	6745	77.0
1990	8290.7	1038	94.4	81.2	94.4	81.1	91.1	78.3	8143	93.0
1991	7041.4	1041	78.4	80.8	78.4	80.7	77.2	78.2	6955	79.4
1992	7186.2	1044	80.2	80.7	80.2	80.6	78.4	78.2	7119	81.0
1993	8337.9	1044	92.3	82.0	92.3	81.9	91.2	79.6	8094	92.4
1994	6909.8	1073	74.7	81.2	74.7	81.2	73.5	79.0	6577	75.1
1995	8192.7	1094	87.8	81.9	87.8	81.8	85.5	79.6	7691	87.8
1996	9127.2	1094	95.0	83.0	95.0	83.0	95.0	81.0	8346	95.0
1997	7732.6	1094	82.4	83.0	82.4	82.9	80.7	80.9	7211	82.3
1998	8820.8	1094	93.3	83.7	93.3	83.7	92.0	81.8	8172	93.3
1999	7794.7	1094	83.0	83.7	83.0	83.7	81.3	81.7	7268	83.0
2000	9347.2	1094	97.8	84.6	97.8	84.6	97.3	82.8	8587	97.8
2001	8397.1	1111	87.9	84.8	87.9	84.8	86.9	83.0	7693	87.8
2002	9306.2	1111	96.4	85.5	96.4	85.4	95.6	83.7	8439	96.3
2003	8654.7	1140	88.2	85.6	88.2	85.6	87.2	83.9	7701	87.9
2004	10057.1	1140	100.0	86.4	100.0	86.4	100.4	84.8	8784	100.0
2005	8885.7	1140	90.2	86.6	90.2	86.6	89.0	85.0	7900	90.2
2006	9270.9	1140	93.1	86.9	93.1	86.9	92.8	85.4	8155	93.1
2007	8781.6	1140	88.2	87.0	88.2	86.9	87.9	85.5	7726	88.2
2008	10091.4	1140	100.0	87.5	100.0	87.5	100.8	86.2	8784	100.0
2009	9011.1	1140	88.8	87.6	88.8	87.6	90.2	86.4	7775	88.8
2010	10221.2	1190	99.2	88.1	99.2	88.1	98.1	86.9	8686	99.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1984 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					231	
B. Refuelling without a maintenance					5	
C. Inspection, maintenance or repair combined with refuelling				728		
D. Inspection, maintenance or repair without refuelling	73			42	0	
E. Testing of plant systems or components				71		
J. Grid limitation, failure or grid unavailability						1
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					10	
Subtotal	73	0	0	841	246	1
Total		73			1088	

7. Equipment Related Full Outages, Analysis by System

System	2010	1984 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		17
12. Reactor I&C Systems		7
13. Reactor Auxiliary Systems		6
14. Safety Systems		5
15. Reactor Cooling Systems		16
31. Turbine and auxiliaries		20
32. Feedwater and Main Steam System		26
41. Main Generator Systems		28
42. Electrical Power Supply Systems		49
XX. Miscellaneous Systems		34
Total	0	208

US-289 THREE MILE ISLAND-1

Operator: EXELON (Exelon Generation Co., LLC)
 Contractor: B&W (BABCOCK & WILCOX CO.)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUF) at the beginning of 2010: 805.0 MW(e)
 Design Net Capacity: 819.0 MW(e)
 Design Discharge Burnup: 54000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 6633.8 GW(e).h
 Energy Availability Factor: 92.5%
 Load Factor: 94.1%
 Operating Factor: 92.3%
 Energy Unavailability Factor: 7.5%
 Total Off-line Time: 676 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	132.2	564.6	571.3	599.2	559.0	586.4	604.4	595.0	568.1	621.2	607.3	625.1	6633.8
EAF (%)	27.3	100.0	94.7	100.0	92.6	100.0	100.0	100.0	96.8	100.0	100.0	100.0	92.5
UCF (%)	27.3	100.0	94.7	100.0	92.7	100.0	100.0	100.0	96.8	100.0	100.0	100.0	92.5
LF (%)	22.1	104.4	95.5	103.4	93.3	101.2	100.9	99.3	98.0	103.7	104.6	104.4	94.1
OF (%)	25.5	100.0	94.5	100.0	92.3	100.0	100.0	100.0	96.7	100.0	100.0	100.0	92.3
EUf (%)	72.7	0.0	5.3	0.0	7.4	0.0	0.0	0.0	3.2	0.0	0.0	0.0	7.5
PUf (%)	72.7	0.0	0.0	0.0	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
UCLF (%)	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	0.0	0.7
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 18/05/1968
 Date of First Criticality: 06 May 1974
 Date of Grid Connection: 19/06/1974
 Date of Commercial Operation: 09 Feb 1974
 Lifetime Generation: 184863.1 GW(e).h
 Cumulative Energy Availability Factor: 73.0%
 Cumulative Load Factor: 73.5%
 Cumulative Unit Capability Factor: 86.6%
 Cumulative Energy Unavailability Factor: 27.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1974	1992.4	789	88.2	88.2	88.2	88.2	85.9	85.9	2584	88.3
1975	5541.6	792	79.7	81.8	79.7	81.8	79.9	81.4	7198	82.2
1976	4344.4	792	62.5	73.5	62.5	73.5	62.4	73.3	5745	65.4
1977	5466.6	792	78.7	75.1	78.7	75.1	78.8	74.9	7087	80.9
1978	5681.9	788	82.0	76.7	82.0	76.7	82.3	76.6	7454	85.1
1979	888.7	776	12.9	64.9	12.9	64.9	13.1	64.9	1128	12.9
1980	0.0	776	100.0	70.4	0.0	54.8	0.0	54.8	0	0.0
1981	0.0	776	100.0	74.4	0.0	47.4	0.0	47.4	0	0.0
1982	0.0	776	100.0	77.4	0.0	41.8	0.0	41.8	0	0.0
1983	0.0	776	100.0	79.8	0.0	37.3	0.0	37.3	0	0.0
1984	0.0	776	100.0	81.8	0.0	33.8	0.0	33.7	0	0.0
1985	811.7	776	37.8	77.9	37.8	34.1	11.9	31.8	1853	21.2
1986	4818.3	776	70.8	77.3	70.8	37.1	70.9	35.0	6209	70.9
1987	5034.3	776	72.5	77.0	72.5	39.7	74.1	37.9	6351	72.5
1988	5465.4	784	76.0	76.9	76.0	42.2	79.4	40.8	6679	76.0
1989	7216.8	808	99.5	78.4	99.5	46.1	102.0	44.9	8714	99.5
1990	5316.2	808	81.8	78.6	81.8	48.3	75.1	46.8	7123	81.3
1991	5671.2	808	86.4	79.1	86.4	50.6	80.1	48.8	7536	86.0
1992	6936.5	789	99.5	80.2	99.5	53.3	100.0	51.6	8743	99.5
1993	5962.2	786	88.0	80.6	88.0	55.1	86.6	53.4	7702	87.9
1994	6590.9	786	95.3	81.3	95.3	57.1	95.7	55.5	8349	95.3
1995	6388.0	786	90.5	81.8	90.5	58.6	92.8	57.2	7926	90.5
1996	7100.3	786	100.0	82.6	100.0	60.5	102.8	59.3	8784	100.0
1997	5918.8	786	87.3	82.8	87.3	61.6	86.0	60.4	7633	87.1
1998	7059.2	786	100.0	83.5	100.0	63.2	102.5	62.2	8760	100.0
1999	6328.4	786	89.4	83.7	89.4	64.2	91.9	63.3	7827	89.3
2000	7144.9	786	100.0	84.4	100.0	65.6	103.5	64.9	8784	100.0
2001	5416.7	786	80.3	84.2	80.3	66.1	78.7	65.4	7034	80.3
2002	7313.5	802	100.0	84.8	100.0	67.4	104.6	66.8	8760	100.0
2003	6205.1	802	86.7	84.8	86.7	68.0	88.3	67.5	7602	86.8
2004	7273.3	802	100.0	85.3	100.0	69.1	103.2	68.7	8784	100.0
2005	6755.4	786	93.0	85.6	93.0	69.9	98.1	69.7	8145	93.0
2006	7227.0	786	99.1	86.0	98.7	70.8	105.0	70.7	8647	98.7
2007	6645.3	786	91.7	86.2	91.7	71.4	96.5	71.5	8034	91.7
2008	7365.1	786	100.0	86.6	100.0	72.2	106.7	72.5	8784	100.0
2009	5891.6	786	81.7	86.4	81.7	72.5	85.6	72.9	7152	81.6
2010	6633.8	805	92.5	86.6	92.5	73.0	94.1	73.5	8084	92.3

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1974 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		63			116	
B. Refuelling without a maintenance					8	
C. Inspection, maintenance or repair combined with refuelling	553			605		
D. Inspection, maintenance or repair without refuelling	56			62	1	
E. Testing of plant systems or components				9	0	
H. Nuclear regulatory requirements					182	1600
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	
Subtotal	609	63	0	676	308	1600
Total		672			2584	

7. Equipment Related Full Outages, Analysis by System

System	2010	1974 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		22
13. Reactor Auxiliary Systems		9
15. Reactor Cooling Systems	40	28
16. Steam generation systems		6
31. Turbine and auxiliaries	23	25
32. Feedwater and Main Steam System		5
35. All other I&C Systems		0
41. Main Generator Systems		6
42. Electrical Power Supply Systems		3
XX. Miscellaneous Systems		0
Total	63	104

US-250 TURKEY POINT-3

Operator: FPL (FLORIDA POWER & LIGHT CO.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 693.0 MW(e)
 Design Net Capacity: 693.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5358.1 GW(e).h
 Energy Availability Factor: 86.7%
 Load Factor: 88.3%
 Operating Factor: 86.7%
 Energy Unavailability Factor: 13.3%
 Total Off-line Time: 1166 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	543.5	476.2	541.9	518.8	525.1	496.0	518.6	516.2	376.6	0.0	298.6	546.6	5358.1
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.7	0.0	65.9	100.0	86.7
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.7	0.0	65.9	100.0	86.7
LF (%)	105.4	102.3	105.2	104.0	101.8	99.4	100.6	100.1	75.5	0.0	59.8	106.0	88.3
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.7	0.0	65.7	100.0	86.7
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.3	100.0	34.1	0.0	13.3
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	100.0	29.0	0.0	12.2
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	5.1	0.0	1.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 27/04/1967
 Date of First Criticality: 20/10/1972
 Date of Grid Connection: 11 Feb 1972
 Date of Commercial Operation: 14/12/1972
 Lifetime Generation: 170026.9 GW(e).h
 Cumulative Energy Availability Factor: 77.5%
 Cumulative Load Factor: 75.9%
 Cumulative Unit Capability Factor: 77.6%
 Cumulative Energy Unavailability Factor: 22.5%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	75.0	670	100.0	100.0	100.0	100.0	14.5	14.5	304	40.9
1973	Data not provided									
1974	3478.8	666	100.0	100.0	100.0	100.0	59.6	56.0	6090	69.5
1975	4376.0	666	74.9	88.0	74.9	88.0	75.0	65.1	6948	79.3
1976	4322.0	666	73.9	83.4	73.9	83.4	73.9	67.9	6665	75.9
1977	4474.1	666	76.6	81.8	76.6	81.8	76.7	70.1	6994	79.8
1978	4502.7	666	77.2	80.9	77.2	80.9	77.2	71.5	7087	80.9
1979	2881.6	666	49.4	75.7	49.4	75.7	49.4	67.8	4509	51.5
1980	4389.0	657	77.9	76.0	77.9	76.0	76.1	69.0	6812	77.6
1981	933.2	646	13.2	68.4	13.2	68.4	16.5	62.7	1385	15.8
1982	3771.4	646	64.2	68.0	64.2	68.0	66.6	63.1	5612	64.1
1983	4331.0	659	73.3	68.5	73.3	68.5	75.0	64.3	6415	73.2
1984	4784.2	666	82.6	69.8	82.6	69.8	81.8	65.9	7253	82.6
1985	3421.0	666	61.0	69.1	59.7	69.0	58.6	65.3	5224	59.6
1986	4513.1	666	77.9	69.7	77.9	69.6	77.4	66.2	6816	77.8
1987	885.3	666	17.9	66.0	17.9	66.0	15.2	62.6	1566	17.9
1988	3468.0	666	60.6	65.7	60.6	65.6	59.3	62.3	5320	60.6
1989	3605.1	666	65.1	65.6	65.1	65.6	61.8	62.3	5696	65.0
1990	3388.4	666	59.4	65.3	59.4	65.2	58.1	62.1	5200	59.4
1991	1332.0	666	50.0	64.4	50.0	64.4	22.8	59.9	2155	24.6
1992	3428.2	666	67.2	64.6	67.2	64.5	58.6	59.8	5896	67.1
1993	5657.3	666	96.1	66.1	96.1	66.1	97.0	61.7	8421	96.1
1994	4924.9	666	85.8	67.1	85.8	67.0	84.4	62.7	7513	85.8
1995	5219.0	666	89.6	68.1	89.6	68.0	89.5	64.0	7846	89.6
1996	5750.8	673	96.7	69.4	96.7	69.3	97.3	65.4	8490	96.7
1997	5252.4	693	87.0	70.1	87.0	70.1	86.5	66.3	7570	86.4
1998	5408.3	693	89.8	70.9	89.0	70.9	89.1	67.3	7757	88.6
1999	6112.3	693	99.1	72.1	99.1	72.0	100.7	68.6	8684	99.1
2000	5684.4	693	92.5	72.8	92.5	72.8	93.4	69.6	8122	92.5
2001	5526.0	693	90.5	73.5	90.5	73.4	91.0	70.4	7923	90.4
2002	6215.4	693	100.0	74.4	100.0	74.4	102.4	71.5	8760	100.0
2003	5445.6	693	90.6	75.0	90.6	74.9	89.7	72.1	7930	90.5
2004	4734.0	693	79.0	75.1	79.0	75.1	77.8	72.3	6934	78.9
2005	5798.9	693	96.4	75.8	95.5	75.7	95.5	73.0	8362	95.5
2006	5581.9	693	90.3	76.3	90.3	76.2	91.9	73.6	7905	90.2
2007	6078.1	693	83.6	76.5	83.6	76.4	100.1	74.4	7320	83.6
2008	6139.5	693	99.8	77.2	98.1	77.0	100.9	75.2	8617	98.1
2009	5249.3	693	85.1	77.4	85.1	77.3	86.5	75.5	7451	85.1
2010	5358.1	693	86.7	77.6	86.7	77.5	88.3	75.9	7594	86.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		91		0	428	
B. Refuelling without a maintenance					4	
C. Inspection, maintenance or repair combined with refuelling	1073			855		
D. Inspection, maintenance or repair without refuelling				299		
E. Testing of plant systems or components				8	1	
F. Major back-fitting, refurbishment or upgrading activities with refuelling				3		
J. Grid limitation, failure or grid unavailability						3
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				264	16	5
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
P. Fire					2	
Z. Others					0	
Subtotal	1073	91	0	1429	451	10
Total		1164			1890	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		37
13. Reactor Auxiliary Systems		52
14. Safety Systems		19
15. Reactor Cooling Systems		77
16. Steam generation systems		21
17. Safety I&C Systems (excluding reactor I&C)		1
31. Turbine and auxiliaries		37
32. Feedwater and Main Steam System		28
33. Circulating Water System	36	1
35. All other I&C Systems		2
41. Main Generator Systems		73
42. Electrical Power Supply Systems	54	9
XX. Miscellaneous Systems		43
Total	90	400

US-251 TURKEY POINT-4

Operator: FPL (FLORIDA POWER & LIGHT CO.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 693.0 MW(e)
 Design Net Capacity: 693.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 5949.8 GW(e).h
 Energy Availability Factor: 95.9%
 Load Factor: 98.0%
 Operating Factor: 95.9%
 Energy Unavailability Factor: 4.1%
 Total Off-line Time: 363 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	474.8	491.2	541.5	511.7	526.0	502.2	522.3	510.2	423.2	534.7	508.4	403.6	5949.8
EAF (%)	89.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.9	100.0	100.0	75.7	95.9
UCF (%)	89.3	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.9	100.0	100.0	75.7	95.9
LF (%)	92.1	105.5	105.2	102.6	102.0	100.6	101.3	99.0	84.8	103.7	101.8	78.3	98.0
OF (%)	89.2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	85.8	100.0	100.0	75.7	95.9
EUf (%)	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	0.0	0.0	24.3	4.1
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.1	0.0	0.0	24.3	4.1
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 27/04/1967
 Date of First Criticality: 06 Nov 1973
 Date of Grid Connection: 21/06/1973
 Date of Commercial Operation: 09 Jul 1973
 Lifetime Generation: 166251.6 GW(e).h
 Cumulative Energy Availability Factor: 77.6%
 Cumulative Load Factor: 75.3%
 Cumulative Unit Capability Factor: 77.7%
 Cumulative Energy Unavailability Factor: 22.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1973			Data not provided							
1974	4513.4	728	100.0	100.0	100.0	100.0	70.8	70.8	6759	77.2
1975	3991.9	666	68.3	84.9	68.3	84.9	68.4	69.7	6172	70.5
1976	3774.8	666	64.3	78.2	64.3	78.2	64.5	68.0	5825	66.3
1977	3671.0	666	62.7	74.4	62.7	74.4	62.9	66.8	5578	63.7
1978	3791.4	666	65.0	72.6	65.0	72.6	65.0	66.4	6693	76.4
1979	3846.6	666	65.9	71.5	65.9	71.5	65.9	66.3	6361	72.6
1980	3856.5	657	69.4	71.2	69.4	71.2	66.8	66.4	6093	69.4
1981	4507.2	646	77.3	71.9	77.3	71.9	79.6	68.0	6801	77.6
1982	3847.2	646	66.3	71.3	66.3	71.3	68.0	68.0	5806	66.3
1983	2978.9	659	52.4	69.5	52.4	69.5	51.6	66.4	4568	52.1
1984	3084.1	666	54.4	68.1	54.4	68.1	52.7	65.1	4774	54.3
1985	5177.9	666	89.8	69.9	89.7	69.9	88.8	67.1	7852	89.6
1986	1744.0	666	31.9	67.0	31.9	67.0	29.9	64.2	2790	31.8
1987	2657.5	666	49.3	65.7	49.3	65.7	45.6	62.9	4314	49.2
1988	3267.7	666	56.8	65.1	56.8	65.1	55.9	62.4	4986	56.8
1989	2107.6	666	42.0	63.7	42.0	63.7	36.1	60.8	3676	42.0
1990	4384.9	666	76.4	64.4	76.4	64.4	75.2	61.6	6692	76.4
1991	808.0	666	48.2	63.5	48.2	63.5	13.9	59.0	1335	15.2
1992	4642.3	666	81.3	64.5	81.3	64.5	79.4	60.1	7139	81.3
1993	4746.3	666	83.1	65.4	83.1	65.4	81.4	61.1	7277	83.1
1994	4844.4	666	85.0	66.3	85.0	66.3	83.0	62.2	7437	84.9
1995	5780.1	666	98.5	67.8	98.5	67.8	99.1	63.8	8629	98.5
1996	5165.4	673	88.6	68.7	88.6	68.7	87.4	64.9	7771	88.5
1997	5442.6	693	89.6	69.6	89.6	69.6	89.7	65.9	7809	89.1
1998	6181.5	693	100.0	70.9	100.0	70.9	101.8	67.4	8760	100.0
1999	5735.3	693	93.4	71.8	93.4	71.8	94.5	68.5	8185	93.4
2000	5591.4	693	91.4	72.5	91.4	72.5	91.9	69.4	8028	91.4
2001	6105.3	693	98.4	73.5	98.4	73.5	100.6	70.6	8623	98.4
2002	5854.1	693	95.6	74.3	95.6	74.3	96.4	71.5	8369	95.5
2003	5562.5	693	91.7	74.9	91.7	74.9	91.6	72.2	8033	91.7
2004	6079.2	693	98.6	75.7	98.6	75.6	99.9	73.1	8662	98.6
2005	4241.0	693	72.4	75.5	71.3	75.5	69.9	73.0	6243	71.3
2006	5383.7	693	87.6	75.9	87.6	75.9	88.7	73.5	7669	87.5
2007	5148.8	693	97.6	76.6	97.6	76.5	84.8	73.8	8552	97.6
2008	5234.9	693	85.2	76.8	84.4	76.8	86.0	74.2	7415	84.4
2009	5435.4	693	89.2	77.2	89.2	77.1	89.5	74.6	7811	89.2
2010	5949.8	693	95.9	77.7	95.9	77.6	98.0	75.3	8397	95.9

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1975 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		323			368	
B. Refuelling without a maintenance					11	
C. Inspection, maintenance or repair combined with refuelling				1223		
D. Inspection, maintenance or repair without refuelling				129		
E. Testing of plant systems or components				7		
H. Nuclear regulatory requirements				160		
J. Grid limitation, failure or grid unavailability						2
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					141	0
L. Human factor related		37				
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						2
Subtotal	0	360	0	1519	520	4
Total		360			2043	

7. Equipment Related Full Outages, Analysis by System

System	2010	1975 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems	63	20
13. Reactor Auxiliary Systems		3
14. Safety Systems		4
15. Reactor Cooling Systems		96
16. Steam generation systems	79	100
31. Turbine and auxiliaries		59
32. Feedwater and Main Steam System	180	20
33. Circulating Water System		3
35. All other I&C Systems		2
41. Main Generator Systems		1
42. Electrical Power Supply Systems		46
Total	322	361

US-271 VERMONT YANKEE

Operator: ENTERGY (ENTERGY NUCLEAR OPERATIONS, Inc.)
 Contractor: GE (GENERAL ELECTRIC CO.)

1. Station Details

Type: BWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 620.0 MW(e)
 Design Net Capacity: 514.0 MW(e)
 Design Discharge Burnup: 33760 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 4782.5 GW(e).h
 Energy Availability Factor: 90.7%
 Load Factor: 88.1%
 Operating Factor: 90.7%
 Energy Unavailability Factor: 9.3%
 Total Off-line Time: 814 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	456.0	420.2	462.5	340.8	34.4	435.2	444.7	445.0	429.4	464.9	382.3	467.1	4782.5
EAF (%)	100.0	100.0	100.0	76.7	24.1	100.0	100.0	100.0	100.0	100.0	89.2	100.0	90.7
UCF (%)	100.0	100.0	100.0	76.7	24.1	100.0	100.0	100.0	100.0	100.0	89.2	100.0	90.7
LF (%)	98.9	100.8	100.4	76.3	7.5	97.5	96.4	96.5	96.2	100.8	85.5	101.3	88.1
OF (%)	100.0	100.0	100.0	79.9	20.7	100.0	100.0	100.0	100.0	100.0	89.0	100.0	90.7
EUF (%)	0.0	0.0	0.0	23.3	75.9	0.0	0.0	0.0	0.0	0.0	10.8	0.0	9.3
PUF (%)	0.0	0.0	0.0	23.3	68.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7
UCLF (%)	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	0.0	0.0	10.8	0.0	1.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 12 Nov 1967
 Date of First Criticality: 24/03/1972
 Date of Grid Connection: 20/09/1972
 Date of Commercial Operation: 30/11/1972
 Lifetime Generation: 143503.2 GW(e).h
 Cumulative Energy Availability Factor: 84.9%
 Cumulative Load Factor: 82.6%
 Cumulative Unit Capability Factor: 85.0%
 Cumulative Energy Unavailability Factor: 15.1%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1972	291.4	502	100.0	100.0	100.0	100.0	38.7	38.7	963	65.8
1973	1814.5	468	70.3	74.9	70.3	74.9	44.3	43.4	5354	61.1
1974	2482.7	514	55.4	65.5	55.4	65.5	55.1	49.1	6495	74.1
1975	3561.3	504	80.5	70.3	80.5	70.3	80.7	59.2	7689	87.8
1976	3260.2	504	73.5	71.1	73.5	71.1	73.6	62.7	6776	77.1
1977	3537.9	504	79.8	72.8	79.8	72.8	80.1	66.1	7456	85.1
1978	3240.7	504	73.4	72.9	73.4	72.9	73.4	67.3	6649	75.9
1979	3449.0	504	77.4	73.5	77.4	73.5	78.1	68.8	7194	82.1
1980	2978.8	504	73.2	73.5	72.0	73.3	67.3	68.6	6271	71.4
1981	3568.5	504	84.8	74.7	84.8	74.6	80.8	70.0	7407	84.6
1982	4174.3	504	96.7	76.9	96.7	76.8	94.5	72.4	8406	96.0
1983	2874.5	504	69.8	76.3	69.8	76.2	65.1	71.7	6072	69.3
1984	3335.8	504	79.0	76.5	79.0	76.4	75.3	72.0	6933	78.9
1985	2999.4	504	71.8	76.1	71.8	76.0	67.9	71.7	6287	71.8
1986	2058.4	504	48.9	74.2	48.9	74.1	46.6	69.9	4280	48.9
1987	3536.4	504	83.2	74.8	83.2	74.7	80.1	70.6	7288	83.2
1988	4113.8	504	94.9	76.0	94.9	76.0	92.9	72.0	8333	94.9
1989	3606.8	504	84.4	76.5	84.4	76.5	81.7	72.6	7372	84.2
1990	3616.3	504	84.7	77.0	84.7	76.9	81.9	73.1	7392	84.4
1991	4108.3	504	95.1	77.9	93.7	77.8	93.1	74.1	8200	93.6
1992	3734.6	504	87.6	78.4	87.6	78.3	84.4	74.6	7680	87.4
1993	3372.1	504	78.6	78.4	78.6	78.3	76.4	74.7	6860	78.3
1994	4315.6	504	98.2	79.3	98.2	79.2	97.7	75.8	8600	98.2
1995	3858.5	507	86.6	79.6	86.6	79.5	86.8	76.2	7554	86.2
1996	3798.8	510	84.9	79.9	84.9	79.8	84.8	76.6	7422	84.5
1997	4266.9	510	95.6	80.5	95.6	80.4	95.5	77.4	8358	95.4
1998	3358.7	510	76.6	80.3	76.6	80.2	75.2	77.3	6690	76.4
1999	4059.1	510	90.5	80.7	90.5	80.6	90.9	77.8	7936	90.6
2000	4548.1	510	99.5	81.4	99.5	81.3	101.5	78.6	8738	99.5
2001	4171.1	510	93.1	81.8	93.1	81.7	93.4	79.1	8145	93.0
2002	3962.6	510	91.0	82.1	91.0	82.0	88.7	79.5	7966	90.9
2003	4444.2	510	98.3	82.6	98.3	82.6	99.5	80.1	8612	98.3
2004	3858.0	510	86.6	82.8	86.6	82.7	86.1	80.3	7599	86.5
2005	4106.4	506	93.8	83.1	93.8	83.0	92.6	80.7	8212	93.7
2006	5106.6	557	100.0	83.6	100.0	83.6	104.5	81.4	8760	100.0
2007	4703.7	620	92.6	83.9	92.6	83.9	86.6	81.6	8114	92.6
2008	4895.1	620	94.0	84.3	94.0	84.2	89.9	81.9	8253	94.0
2009	5360.6	620	100.0	84.8	100.0	84.7	98.7	82.4	8760	100.0
2010	4782.5	620	90.7	85.0	90.7	84.9	88.1	82.6	7946	90.7

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1972 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		135			230	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling	676			852		
D. Inspection, maintenance or repair without refuelling				109	0	
E. Testing of plant systems or components				6	10	
H. Nuclear regulatory requirements						5
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)				20		5
Subtotal	676	135	0	987	246	10
Total		811			1243	

7. Equipment Related Full Outages, Analysis by System

System	2010	1972 to 2010
	Hours Lost	Average Hours Lost Per Year
11. Reactor and Accessories		7
12. Reactor I&C Systems		6
13. Reactor Auxiliary Systems		16
14. Safety Systems		44
15. Reactor Cooling Systems		38
31. Turbine and auxiliaries		37
32. Feedwater and Main Steam System	78	18
42. Electrical Power Supply Systems	56	57
XX. Miscellaneous Systems		1
Total	134	224

US-395 VIRGIL C. SUMMER-1

Operator: SCE&G (SOUTH CAROLINA ELECTRIC & GAS CO.)
 Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 966.0 MW(e)
 Design Net Capacity: 900.0 MW(e)
 Design Discharge Burnup: 38900 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 8487.1 GW(e).h
 Energy Availability Factor: 99.1%
 Load Factor: 100.3%
 Operating Factor: 99.1%
 Energy Unavailability Factor: 0.9%
 Total Off-line Time: 79 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	730.6	637.3	732.0	707.2	731.3	696.7	719.7	716.6	636.0	731.6	712.6	735.5	8487.1
EAF (%)	100.0	97.4	100.0	100.0	100.0	100.0	100.0	100.0	91.6	100.0	100.0	100.0	99.1
UCF (%)	100.0	97.4	100.0	100.0	100.0	100.0	100.0	100.0	91.6	100.0	100.0	100.0	99.1
LF (%)	101.7	98.2	102.0	101.7	101.7	100.2	100.1	99.7	91.4	101.8	102.3	102.3	100.3
OF (%)	100.0	97.3	100.0	100.0	100.0	100.0	100.0	100.0	91.5	100.0	100.0	100.0	99.1
EUf (%)	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.9
PUf (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	0.0	0.7
UCLF (%)	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 21/03/1973
 Date of First Criticality: 22/10/1982
 Date of Grid Connection: 16/11/1982
 Date of Commercial Operation: 01 Jan 1984

Lifetime Generation: 185964.1 GW(e).h
 Cumulative Energy Availability Factor: 85.0%
 Cumulative Load Factor: 82.7%
 Cumulative Unit Capability Factor: 85.0%
 Cumulative Energy Unavailability Factor: 15.0%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1984	4208.6	900	61.3	61.3	61.3	61.3	53.2	53.2	5362	61.0
1985	5235.1	885	71.6	66.4	71.6	66.4	67.5	60.3	6272	71.6
1986	7160.6	885	95.3	76.0	95.3	76.0	92.4	70.9	8346	95.3
1987	5168.1	885	70.1	74.5	70.1	74.5	66.7	69.9	6135	70.0
1988	5068.2	885	67.8	73.2	67.8	73.2	65.2	68.9	5952	67.8
1989	5412.8	885	80.8	74.4	80.8	74.4	69.8	69.1	7073	80.7
1990	6117.3	885	82.9	75.6	82.9	75.6	78.9	70.5	7261	82.9
1991	5346.1	885	80.7	76.3	80.7	76.3	69.0	70.3	7065	80.7
1992	7515.2	885	97.1	78.6	97.1	78.6	96.7	73.2	8532	97.1
1993	6109.5	885	82.9	79.0	82.9	79.0	78.8	73.8	7258	82.9
1994	4456.0	885	68.8	78.1	68.8	78.1	57.5	72.3	6022	68.7
1995	7561.4	885	96.8	79.6	96.8	79.6	97.5	74.4	8478	96.8
1996	7155.1	923	89.6	80.4	89.6	80.4	88.2	75.5	7829	89.1
1997	7267.9	948	89.9	81.2	89.9	81.2	87.5	76.4	7805	89.1
1998	8188.9	953	98.7	82.4	98.7	82.4	98.1	77.9	8638	98.6
1999	7376.3	954	88.8	82.8	88.8	82.8	88.3	78.6	7779	88.8
2000	6358.8	965	76.2	82.4	76.2	82.4	75.0	78.4	6688	76.1
2001	6757.5	966	81.0	82.3	81.0	82.3	79.9	78.5	7095	81.0
2002	7379.5	966	87.3	82.6	87.3	82.6	87.2	79.0	7645	87.3
2003	7352.1	966	86.4	82.8	86.4	82.8	86.9	79.4	7564	86.3
2004	8243.3	966	95.8	83.5	95.8	83.5	97.1	80.3	8413	95.8
2005	7469.4	966	88.4	83.7	88.4	83.7	88.3	80.7	7746	88.4
2006	7521.4	966	88.9	83.9	88.9	83.9	88.9	81.0	7783	88.8
2007	8479.0	966	99.5	84.6	99.5	84.6	100.2	81.9	8719	99.5
2008	7178.1	966	84.3	84.6	84.3	84.6	84.6	82.0	7404	84.3
2009	6872.0	966	81.6	84.5	81.6	84.5	81.2	82.0	7150	81.6
2010	8487.1	966	99.1	85.0	99.1	85.0	100.3	82.7	8681	99.1

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1983 to 2010		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		17		8	152	
B. Refuelling without a maintenance					10	
C. Inspection, maintenance or repair combined with refuelling				997		
D. Inspection, maintenance or repair without refuelling	60			153		
E. Testing of plant systems or components				2	0	
J. Grid limitation, failure or grid unavailability						0
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					34	1
Subtotal	60	17	0	1160	196	1
Total		77			1357	

7. Equipment Related Full Outages, Analysis by System

System	2010	1983 to 2010
	Hours Lost	Average Hours Lost Per Year
12. Reactor I&C Systems		15
14. Safety Systems		4
15. Reactor Cooling Systems		45
16. Steam generation systems		19
31. Turbine and auxiliaries		13
32. Feedwater and Main Steam System		13
35. All other I&C Systems		1
41. Main Generator Systems		25
42. Electrical Power Supply Systems	17	11
Total	17	146

US-424 VOGTLE-1

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1150.0 MW(e)
Design Net Capacity: 1122.0 MW(e)
Design Discharge Burnup: 36400 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 10247.4 GW(e).h
Energy Availability Factor: 100.0%
Load Factor: 101.7%
Operating Factor: 100.0%
Energy Unavailability Factor: 0.0%
Total Off-line Time: 0 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	886.5	800.4	879.8	846.3	867.2	830.8	857.1	856.4	836.3	858.7	843.1	885.0	10247.4
EAF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
UCF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LF (%)	103.6	103.6	103.0	102.2	101.4	100.3	100.2	100.1	101.0	100.4	101.7	103.4	101.7
OF (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
EUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1976 **Lifetime Generation:** 207049.8 GW(e).h
Date of First Criticality: 03 Sep 1987 **Cumulative Energy Availability Factor:** 90.3%
Date of Grid Connection: 27/03/1987 **Cumulative Load Factor:** 90.4%
Date of Commercial Operation: 06 Jan 1987 **Cumulative Unit Capability Factor:** 90.3%
Cumulative Energy Unavailability Factor: 9.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1987	Data not provided									
1988	6799.7	1079	74.2	74.2	74.2	74.2	71.7	71.7	6569	74.8
1989	8709.4	1083	94.2	84.2	94.2	84.2	91.8	81.8	8275	94.5
1990	7353.1	1079	78.4	82.3	78.4	82.3	77.8	80.5	6980	79.7
1991	7501.7	1100	78.9	81.4	78.9	81.4	77.9	79.8	7016	80.1
1992	9383.5	1105	96.9	84.6	96.9	84.6	96.7	83.2	8523	97.0
1993	8600.7	1145	86.3	84.9	86.3	84.9	85.7	83.7	7577	86.5
1994	8817.2	1168	89.6	85.6	89.6	85.6	86.1	84.0	7847	89.6
1995	9984.0	1162	99.2	87.4	98.4	87.3	98.1	85.9	8621	98.4
1996	8149.8	1162	81.5	86.7	81.5	86.6	79.8	85.2	7162	81.5
1997	8270.1	1162	81.9	86.2	81.9	86.1	81.2	84.8	7167	81.8
1998	10216.9	1162	99.8	87.5	99.8	87.4	100.4	86.2	8738	99.7
1999	9425.9	1152	92.6	87.9	92.6	87.8	93.3	86.8	8108	92.6
2000	9196.6	1148	90.7	88.1	90.7	88.1	91.2	87.2	7963	90.7
2001	10144.4	1148	98.9	88.9	98.9	88.8	100.9	88.2	8665	98.9
2002	8638.8	1148	85.3	88.6	85.3	88.6	85.9	88.0	7469	85.3
2003	9411.5	1152	92.5	88.9	92.5	88.8	93.3	88.3	8097	92.4
2004	10162.3	1152	99.0	89.5	99.0	89.5	100.4	89.1	8694	99.0
2005	9220.1	1152	90.9	89.6	90.9	89.5	91.4	89.2	7964	90.9
2006	8671.1	1152	86.0	89.4	86.0	89.3	85.9	89.0	7536	86.0
2007	9960.3	1109	100.0	89.9	100.0	89.9	102.5	89.7	8760	100.0
2008	9050.4	1109	89.1	89.9	89.1	89.8	92.9	89.8	7828	89.1
2009	9135.0	1150	90.1	89.9	90.1	89.8	90.7	89.9	7861	89.7
2010	10247.4	1150	100.0	90.3	100.0	90.3	101.7	90.4	8760	100.0

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1988 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					132	
B. Refuelling without a maintenance					13	
C. Inspection, maintenance or repair combined with refuelling				654		
D. Inspection, maintenance or repair without refuelling				25		
E. Testing of plant systems or components				2		
H. Nuclear regulatory requirements					8	
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					1	2
Z. Others				2		
Subtotal	0	0	0	683	154	2
Total	0			839		

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1988 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		4
14. Safety Systems		24
15. Reactor Cooling Systems		32
17. Safety I&C Systems (excluding reactor I&C)		9
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		19
35. All other I&C Systems		2
41. Main Generator Systems		21
42. Electrical Power Supply Systems		11
Total	0	123

US-425 VOGTLE-2

Operator: SOUTHERN (Southern Nuclear Operating Company, Inc.)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1152.0 MW(e)
Design Net Capacity: 1101.0 MW(e)
Design Discharge Burnup: 36400 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9363.1 GW(e).h
Energy Availability Factor: 91.5%
Load Factor: 92.8%
Operating Factor: 91.4%
Energy Unavailability Factor: 8.5%
Total Off-line Time: 749 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	885.4	801.4	164.3	620.3	873.7	837.9	864.2	863.4	841.8	878.3	854.2	878.0	9363.1
EAF (%)	100.0	100.0	19.2	79.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
UCF (%)	100.0	100.0	19.3	79.4	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.5
LF (%)	103.3	103.5	19.2	74.8	101.9	101.0	100.8	100.7	101.5	102.5	102.8	102.4	92.8
OF (%)	100.0	100.0	20.1	78.5	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.4
EUf (%)	0.0	0.0	80.8	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
PUf (%)	0.0	0.0	80.8	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
UCLF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 08 Jan 1976 **Lifetime Generation:** 194606.2 GW(e).h
Date of First Criticality: 28/03/1989 **Cumulative Energy Availability Factor:** 90.3%
Date of Grid Connection: 04 Oct 1989 **Cumulative Load Factor:** 89.9%
Date of Commercial Operation: 20/05/1989 **Cumulative Unit Capability Factor:** 90.3%
Cumulative Energy Unavailability Factor: 9.7%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1989	5547.2	1110	93.8	93.8	93.8	93.8	94.4	94.4	5104	94.1
1990	6868.0	1110	81.1	85.9	81.1	85.9	70.6	79.6	7125	81.3
1991	8897.4	1097	95.4	89.5	95.4	89.5	92.6	84.5	8375	95.6
1992	7779.6	1109	80.8	87.1	80.8	87.1	79.9	83.2	7175	81.7
1993	8680.9	1140	88.1	87.3	88.1	87.3	86.9	84.0	7737	88.3
1994	9331.6	1168	92.1	88.2	92.1	88.2	91.2	85.4	8062	92.0
1995	9165.6	1162	90.8	88.6	90.3	88.5	90.0	86.1	7908	90.3
1996	9037.6	1162	89.9	88.8	89.9	88.7	88.5	86.4	7899	89.9
1997	10310.8	1162	100.0	90.1	100.0	90.1	101.3	88.2	8760	100.0
1998	8388.6	1162	83.9	89.5	83.9	89.4	82.4	87.6	7347	83.9
1999	9022.6	1156	89.5	89.5	89.5	89.4	89.1	87.7	7833	89.4
2000	10337.8	1149	100.0	90.4	100.0	90.3	102.4	89.0	8784	100.0
2001	9456.7	1149	92.6	90.5	92.6	90.5	94.0	89.4	8112	92.6
2002	8418.9	1149	83.7	90.0	83.7	90.0	83.6	89.0	7328	83.7
2003	9736.6	1149	95.9	90.4	95.9	90.4	96.7	89.5	8401	95.9
2004	9168.7	1149	90.8	90.5	90.8	90.4	90.8	89.6	7970	90.7
2005	8592.9	1149	85.2	90.2	85.2	90.1	85.4	89.3	7464	85.2
2006	9276.1	1149	91.7	90.2	91.7	90.2	92.2	89.5	8024	91.6
2007	8347.3	1127	83.3	89.9	83.3	89.8	84.6	89.2	7323	83.6
2008	8727.1	1127	88.4	89.8	88.4	89.8	88.2	89.2	7767	88.4
2009	10150.9	1152	99.5	90.3	99.5	90.2	100.6	89.7	8710	99.4
2010	9363.1	1152	91.5	90.3	91.5	90.3	92.8	89.9	8011	91.4

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1989 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					120	
B. Refuelling without a maintenance					25	
C. Inspection, maintenance or repair combined with refuelling	748			561		
D. Inspection, maintenance or repair without refuelling				62		
E. Testing of plant systems or components				1		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					12	1
L. Human factor related					4	
Z. Others				3		
Subtotal	748	0	0	627	161	1
Total		748			789	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1989 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		11
13. Reactor Auxiliary Systems		11
14. Safety Systems		13
15. Reactor Cooling Systems		32
16. Steam generation systems		1
31. Turbine and auxiliaries		1
32. Feedwater and Main Steam System		23
35. All other I&C Systems		7
41. Main Generator Systems		12
42. Electrical Power Supply Systems		3
Total	0	114

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1985 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure					222	
B. Refuelling without a maintenance					12	
C. Inspection, maintenance or repair combined with refuelling				725		
D. Inspection, maintenance or repair without refuelling				99		
E. Testing of plant systems or components				0		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					6	1
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						23
Subtotal	0	0	0	824	240	24
Total		0			1088	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1985 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		8
13. Reactor Auxiliary Systems		4
14. Safety Systems		2
15. Reactor Cooling Systems		83
17. Safety I&C Systems (excluding reactor I&C)		30
31. Turbine and auxiliaries		40
32. Feedwater and Main Steam System		22
33. Circulating Water System		2
35. All other I&C Systems		17
41. Main Generator Systems		2
42. Electrical Power Supply Systems		2
Total	0	212

US-390 WATTS BAR-1

Operator: TVA (TENNESSEE VALLEY AUTHORITY)
Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
Net Reference Unit Power (RUP at the beginning of 2010): 1218.0 MW(e)
Design Net Capacity: 1218.0 MW(e)
Design Discharge Burnup: 36000 MW.d/t
Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9738.5 GW(e).h
Energy Availability Factor: 97.5%
Load Factor: 99.0%
Operating Factor: 97.5%
Energy Unavailability Factor: 2.5%
Total Off-line Time: 216 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	831.6	793.0	872.1	838.3	684.3	813.9	837.0	799.8	817.7	861.1	715.4	874.2	9738.5
EAF (%)	100.0	100.0	100.0	100.0	85.6	100.0	100.0	98.1	100.0	100.0	87.0	100.0	97.5
UCF (%)	100.0	100.0	100.0	100.0	85.6	100.0	100.0	98.1	100.0	100.0	87.0	100.0	97.5
LF (%)	99.5	105.1	104.5	103.7	81.9	100.7	100.2	95.7	101.1	103.1	88.4	104.6	99.0
OF (%)	100.0	100.0	100.0	100.0	85.6	100.0	100.0	98.0	100.0	100.0	87.0	100.0	97.5
EUUF (%)	0.0	0.0	0.0	0.0	14.4	0.0	0.0	1.9	0.0	0.0	13.0	0.0	2.5
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	0.0	0.0	14.4	0.0	0.0	1.9	0.0	0.0	13.0	0.0	2.5
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 23/01/1973 **Lifetime Generation:** 129903.0 GW(e).h
Date of First Criticality: 01 Jan 1996 **Cumulative Energy Availability Factor:** 90.2%
Date of Grid Connection: 02 Jun 1996 **Cumulative Load Factor:** 90.3%
Date of Commercial Operation: 27/05/1996 **Cumulative Unit Capability Factor:** 90.2%
Cumulative Energy Unavailability Factor: 9.8%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1996	5141.4	1109	87.7	87.7	87.7	87.7	89.0	89.0	4803	91.4
1997	7600.1	1117	82.3	84.3	82.3	84.3	77.7	81.9	7269	83.0
1998	9681.0	1117	99.0	90.0	99.0	90.0	98.9	88.5	8672	99.0
1999	8267.4	1118	86.8	89.1	86.8	89.1	84.4	87.3	7606	86.8
2000	9076.4	1118	92.5	89.8	92.5	89.8	92.4	88.4	8124	92.5
2001	9626.6	1125	96.1	91.0	96.1	91.0	97.5	90.1	8419	96.1
2002	9079.4	1125	91.3	91.0	91.3	91.0	92.1	90.4	7998	91.3
2003	8549.6	1121	86.2	90.4	86.2	90.4	86.9	89.9	7551	86.2
2004	9856.9	1121	98.8	91.4	98.8	91.4	100.1	91.1	8680	98.8
2005	8816.4	1121	89.5	91.2	89.5	91.2	89.8	91.0	7841	89.5
2006	6697.1	1121	69.7	89.1	69.7	89.1	68.2	88.8	6099	69.6
2007	10049.7	1123	100.0	90.1	100.0	90.1	102.2	90.0	8760	100.0
2008	8112.3	1123	82.5	89.5	82.5	89.5	82.2	89.4	7247	82.5
2009	9207.5	1123	92.0	89.7	92.0	89.7	93.6	89.7	8055	92.0
2010	9738.5	1123	97.5	90.2	97.5	90.2	99.0	90.3	8544	97.5

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1996 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		214			204	
B. Refuelling without a maintenance					6	
C. Inspection, maintenance or repair combined with refuelling				593		
E. Testing of plant systems or components				47	2	
H. Nuclear regulatory requirements				76		
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					13	
L. Human factor related					7	
Subtotal	0	214	0	716	232	0
Total		214			948	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1996 to 2010 Average Hours Lost Per Year
12. Reactor I&C Systems		4
14. Safety Systems		12
15. Reactor Cooling Systems		14
31. Turbine and auxiliaries	121	57
32. Feedwater and Main Steam System		60
33. Circulating Water System		17
35. All other I&C Systems		2
41. Main Generator Systems		19
42. Electrical Power Supply Systems	93	14
Total	214	199

US-482 WOLF CREEK

Operator: WCNO (WOLF CREEK NUCLEAR OPERATION CORP.)

Contractor: WH (WESTINGHOUSE ELECTRIC CORPORATION)

1. Station Details

Type: PWR
 Net Reference Unit Power (RUP) at the beginning of 2010: 1160.0 MW(e)
 Design Net Capacity: 1170.0 MW(e)
 Design Discharge Burnup: 33000 MW.d/t
 Status at end of year: Operational

2. Production Summary 2010

Net Energy Production: 9555.7 GW(e).h
 Energy Availability Factor: 93.2%
 Load Factor: 94.0%
 Operating Factor: 93.2%
 Energy Unavailability Factor: 6.8%
 Total Off-line Time: 597 hours

3. 2010 Monthly Performance Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
GW(e).h	883.0	803.2	653.9	857.5	883.6	841.7	863.9	865.5	847.4	426.7	855.5	773.7	9555.7
EAF (%)	100.0	100.0	76.5	100.0	100.0	100.0	100.0	100.0	100.0	52.7	100.0	90.7	93.2
UCF (%)	100.0	100.0	76.5	100.0	100.0	100.0	100.0	100.0	100.0	52.8	100.0	90.7	93.2
LF (%)	102.3	103.0	75.9	102.7	102.4	100.8	100.1	100.3	101.5	49.4	102.3	89.7	94.0
OF (%)	100.0	100.0	76.4	100.0	100.0	100.0	100.0	100.0	100.0	52.7	100.0	90.6	93.2
EUF (%)	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	47.3	0.0	9.3	6.8
PUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UCLF (%)	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0	47.3	0.0	9.3	6.8
XUF (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

UCLF replaces previously used UUF.

4. 2010 Summary of Operation

5. Historical Summary

Date of Construction Start: 31/05/1977 Lifetime Generation: 221561.8 GW(e).h
 Date of First Criticality: 22/05/1985 Cumulative Energy Availability Factor: 86.6%
 Date of Grid Connection: 06 Dec 1985 Cumulative Load Factor: 86.2%
 Date of Commercial Operation: 09 Mar 1985 Cumulative Unit Capability Factor: 86.7%
 Cumulative Energy Unavailability Factor: 13.4%

Year	Energy [GW.h]	RUP [MW]	Performance for Full Years of Commercial Operation							
			Unit Capability Factor [%]		Energy Availability Factor [%]		Load Factor [%]		Annual Time Online	
			Annual	Cumul.	Annual	Cumul.	Annual	Cumul.	Hours	OF [%]
1985	2942.1	1144	100.0	100.0	100.0	100.0	90.6	90.6	2770	96.2
1986	6966.1	1128	73.0	79.7	73.0	79.7	70.5	75.5	6416	73.2
1987	6504.1	1128	68.6	74.9	68.6	74.9	65.8	71.3	6009	68.6
1988	6676.4	1128	66.8	72.5	66.8	72.5	67.4	70.1	5963	67.9
1989	9709.3	1135	98.4	78.5	98.4	78.5	97.7	76.5	8618	98.4
1990	7889.1	1135	79.8	78.7	79.8	78.7	79.3	77.1	7036	80.3
1991	5891.4	1135	71.0	77.5	71.0	77.5	59.3	74.2	6288	71.8
1992	8490.7	1131	85.4	78.6	85.4	78.6	85.5	75.8	7538	85.8
1993	7908.6	1132	79.3	78.7	79.3	78.7	79.7	76.2	7000	79.9
1994	8546.0	1149	85.4	79.4	85.4	79.4	84.9	77.2	7500	85.6
1995	10062.2	1163	98.5	81.3	98.5	81.3	98.7	79.3	8625	98.5
1996	8233.7	1165	81.8	81.3	80.6	81.2	80.4	79.4	7078	80.6
1997	8447.5	1163	82.8	81.5	82.8	81.4	82.9	79.7	7255	82.8
1998	10400.7	1163	100.0	82.9	100.0	82.8	102.1	81.4	8760	100.0
1999	9156.6	1163	89.6	83.3	89.6	83.3	89.9	82.0	7847	89.6
2000	9071.4	1169	88.8	83.7	88.8	83.6	88.3	82.4	7795	88.7
2001	10346.7	1170	99.7	84.7	99.7	84.6	101.0	83.6	8731	99.7
2002	9041.7	1165	87.8	84.9	87.8	84.8	88.4	83.9	7695	87.8
2003	8902.5	1167	86.7	85.0	86.7	84.9	87.1	84.1	7594	86.7
2004	10132.7	1166	98.8	85.7	98.5	85.6	98.9	84.8	8650	98.5
2005	8820.9	1165	86.0	85.7	86.0	85.6	86.4	84.9	7528	85.9
2006	9350.3	1166	90.6	86.0	90.6	85.9	91.5	85.2	7935	90.6
2007	10369.1	1166	100.0	86.6	100.0	86.5	101.5	86.0	8760	100.0
2008	8505.9	1166	82.8	86.4	82.8	86.4	83.0	85.8	7271	82.8
2009	8768.5	1160	86.0	86.4	86.0	86.3	86.3	85.9	7541	86.1
2010	9555.7	1160	93.2	86.7	93.2	86.6	94.0	86.2	8163	93.2

6. Full Outages, Analysis by Cause

Outage Cause	2010 Hours Lost			1986 to 2010 Average Hours Lost Per Year		
	Planned	Unplanned	External	Planned	Unplanned	External
A. Plant equipment problem/failure		526			136	
B. Refuelling without a maintenance					110	
C. Inspection, maintenance or repair combined with refuelling				866		
D. Inspection, maintenance or repair without refuelling				9	13	
E. Testing of plant systems or components				0	1	
H. Nuclear regulatory requirements		69				
J. Grid limitation, failure or grid unavailability						4
K. Load-following (frequency control, reserve shutdown due to reduced energy demand)					8	4
N. Environmental conditions (lack of cooling water due to dry weather, cooling water temperature limits, flood, storm, lightning, etc.)						1
Subtotal	0	595	0	875	268	9
Total		595			1152	

7. Equipment Related Full Outages, Analysis by System

System	2010 Hours Lost	1986 to 2010 Average Hours Lost Per Year
11. Reactor and Accessories		24
12. Reactor I&C Systems		11
15. Reactor Cooling Systems		1
16. Steam generation systems		6
17. Safety I&C Systems (excluding reactor I&C)		6
31. Turbine and auxiliaries		4
32. Feedwater and Main Steam System	174	20
35. All other I&C Systems		8
41. Main Generator Systems		10
42. Electrical Power Supply Systems		4
XX. Miscellaneous Systems	351	
Total	525	94

6. NON-ELECTRICAL APPLICATION OF NUCLEAR ENERGY IN MEMBER STATES

Table 6.1: District heating and process heat in 2010

Country	Reactor	District heating [Gcal]	Process heat [Gcal]	Total heat [Gcal]
Bulgaria	Kozloduy-5	181225	NA	181225
	Kozloduy-6	43979	NA	43979
Czech Republic	Temelin-1	39852	NA	39852
	Temelin-2	8761	NA	8761
Hungary	PAKS-2	0	NA	0
	PAKS-3	38477	NA	38477
	PAKS-4	127423	NA	127423
India	Rajasthan-1	NA	0	0
	Rajasthan-2	NA	109896	109896
	Rajasthan-3	NA	145	145
	Rajasthan-4	NA	51103	51103
Romania	Cernavoda-1	52821	NA	52821
	Cernavoda-2	2355	NA	2355
Russia	Balakovo-1	17138	0	17138
	Balakovo-2	36561	0	36561
	Balakovo-3	392	0	392
	Balakovo-4	0	0	0
	Beloyarsky-3	255756	0	255756
	Bilibino-1	14143	NA	14143
	Bilibino-2	51061	NA	51061
	Bilibino-3	62812	NA	62812
	Bilibino-4	56912	NA	56912
	Kalinin-1	208692	7948	216640
	Kalinin-2	284217	9768	293985
	Kalinin-3	NA	138896	138896
	Kola-1	6534	274	6808
	Kola-2	7059	282	7341
	Kola-3	5798	208	6006
	Kola-4	8499	233	8732
	Kursk-1	41436	43100	84536
	Kursk-2	84963	87959	172922
	Kursk-3	150974	132402	283376
	Kursk-4	196103	170381	366484
	Leningrad-1	390256	0	390256
	Leningrad-2	210543	0	210543
	Leningrad-3	290490	0	290490
	Leningrad-4	128413	0	128413
	Novovoronezh-3	164994	165299	330293
	Novovoronezh-4	80051	82186	162237
	Novovoronezh-5	7982	16798	24780
	Smolensk-1	172053	22898	194951
	Smolensk-2	194790	9551	204341
	Smolensk-3	134983	12787	147770
	Slovakia	Bohunice-3	248954	694
Bohunice-4		254012	28639	282651
Switzerland	Beznau-1	153457	NA	153457
	Beznau-2	12445	NA	12445
	Goesgen	NA	47375	47375
Ukraine	Khemlnitski-1	143915	NA	143915
	Khemlnitski-2	171381	NA	171381
	Rovno-1	51110	NA	51110
	Rovno-2	33191	NA	33191
	Rovno-3	124183	NA	124183
	Rovno-4	152512	NA	152512
	South Ukraine-1	103473	NA	103473
	South Ukraine-2	164393	NA	164393
	South Ukraine-3	123610	NA	123610
	Zaporozhe-1	74869	NA	74869
	Zaporozhe-2	60064	NA	60064
	Zaporozhe-3	50142	NA	50142
	Zaporozhe-4	46787	NA	46787
	Zaporozhe-5	118719	NA	118719
	Zaporozhe-6	111428	NA	111428

Table 6.2: Water desalination in 2010

Country	Reactor	Thermal energy [Gcal]	Electrical energy for reverse osmosis [MWh]	Water produced [m3]
India	Madras-1	9951	NA	
	Madras-2	0	NA	0
Japan	Genkai-3	26170	NA	367835
	Genkai-4	1906	NA	25742
	Ikata 1&2		NA	333362
	Ikata-3		NA	267300
	Ohi 1&2		NA	1072387
	Takahama 3&4		NA	480340
Pakistan	KANUPP	57159	NA	44440

AR-1

ATUCHA-1

ARGENTINA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: 5 CrNiNb 19-9
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 5.36
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zry-4
Average fuel enrichment [% of U235]	: 0.85
Refuelling frequency [month]	: <Not Available>
Part of the core refuelled [%]	: <Not Available>
Average discharge burnup [MWd/t]	: 11140
Active core diameter [m]	: 4.51
Active core height/length [m]	: 5.3
Number of fissile fuel assemblies/bundles	: 250
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38.8
Moderator weight [t]	: <Not Available>
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.55
Average core power density [kW/dm ³]	: 13.74
Average fuel power density [kW/kgU]	: 30.56
Fuel linear heat generation rate [kW/m]	: 23.22

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: <Not Available>
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: <Not Available>

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 293.4
Operating coolant pressure [MPa]	: 11.5
Reactor outlet temperature [°C]	: 303.3
Reactor inlet temperature [°C]	: 264
Coolant mass flow at the rated power [t/h]	: 21000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 534.7
Design heat transfer surface [m ²]	: 3454

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.5
Design pressure difference [MPa]	: <Not Available>

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 3
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1980

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: <Not Available>
Number of containment spray pumps	: <Not Available>
Containment design pressure [MPa]	: 2.8
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: <Not Available>

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 1
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: <Not Available>
LPSI system pressure [MPa]	: <Not Available>
HPSI system flowrate [t/h]	: <Not Available>
LPSI system flowrate [t/h]	: <Not Available>

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: <Not Available>
Number of IP cylinders per turbine	: <Not Available>
Number of LP cylinders per turbine	: <Not Available>
HP cylinder inlet steam pressure [MPa]	: 4.26
HP cylinder Inlet steam moisture [%]	: <Not Available>
HP cylinder inlet steam temperature [°C]	: 254
HP cylinder Inlet steam flow rate [t/h]	: 1856

Main generator

Rated active power [MWe]	: 357
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: <Not Available>
Output frequency [Hz]	: <Not Available>

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	: <Not Available>
Number of main condensate pumps required for full power	: <Not Available>
Condenser vacuum at the full power (absolute pressure) [kPa]	: <Not Available>

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 2
Number of feedwater pumps required for full power operation	: <Not Available>
Feedwater discharge pressure [MPa]	: <Not Available>
Steam generator feedwater inlet temperature [°C]	: <Not Available>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: <Not Available>
Cable segregation within the unit used for	: <Not Available>
On-site fire brigade	: <Not Available>
Off-site fire brigade response time	: <Not Available>

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: <Not Available>
Number of on site non-safety related gas turbines	: <Not Available>
Other on-site emergency AC power sources	: 3
Estimated time reserve of the batteries at full load [h]	: <Not Available>
Total installed capacity of the on-site emergency power sources per unit [MW]	: <Not Available>
Total battery capacity [Ah]	: <Not Available>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 10120
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Available>

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 304 L-SS-CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 6.3
Inside shell diameter [m]	: 0.104
Shell thickness [mm]	: 4.34
Number of pressure channels	: -
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7190
Active core diameter [m]	: 6.28
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 85.73
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 10.8
Average fuel power density [kW/kgU]	: 23.2
Fuel linear heat generation rate [kW/m]	: 24.75

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: B/GD
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 10.2
Reactor outlet temperature [°C]	: 312
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 8800

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.62
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 253
HP cylinder Inlet steam flow rate [t/h]	: 3600

Main generator

Rated active power [MWe]	: 648
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

AM-19

ARMENIA-2

ARMENIA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	:
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 295.8
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	:
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 13.0
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	: 45
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1338

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 259
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.2

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 740
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 1288

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

BE-2

DOEL-1

BELGIUM

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SOUDOTENAX-56
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 10.6
Inside shell diameter [m]	: 3.327
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 2.44
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 31.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 102.6
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 22.22

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.73
Reactor outlet temperature [°C]	: 315.08
Reactor inlet temperature [°C]	: 284.7
Coolant mass flow at the rated power [t/h]	: 26120

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 24
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 2400

Main generator

Rated active power [MWe]	: 415
Rated apparent power [MVA]	: 500
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SOUDOTENAX-56
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 10.6
Inside shell diameter [m]	: 3.32
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 2.44
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 31.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 102.6
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 22.22

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.73
Reactor outlet temperature [°C]	: 315.08
Reactor inlet temperature [°C]	: 284.7
Coolant mass flow at the rated power [t/h]	: 26120

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 24
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 2400

Main generator

Rated active power [MWe]	: 415
Rated apparent power [MVA]	: 500
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 508-CL-2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 69.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 115
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.73
Reactor outlet temperature [°C]	: 315.08
Reactor inlet temperature [°C]	: 284.7
Coolant mass flow at the rated power [t/h]	: 26120

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 273
HP cylinder Inlet steam flow rate [t/h]	: 1513

Main generator

Rated active power [MWe]	: 1056
Rated apparent power [MVA]	: 1330
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: 1
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 800
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: INOX
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 4.27
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 84.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 96.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 16.47

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.73
Reactor outlet temperature [°C]	: 315.08
Reactor inlet temperature [°C]	: 284.7
Coolant mass flow at the rated power [t/h]	: 26120

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 45
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.28
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 288
HP cylinder Inlet steam flow rate [t/h]	: 1667

Main generator

Rated active power [MWe]	: 1065
Rated apparent power [MVA]	: 1330
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: 1
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 800
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 1.2-MD-07-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.322
Inside shell diameter [m]	: 3.987
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/M5
Average fuel enrichment [% of U235]	: 4.6
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.9
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.79
Average core power density [kW/dm ³]	: 99.87
Average fuel power density [kW/kgU]	: 39.9
Fuel linear heat generation rate [kW/m]	: 23.8

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: Other - TURBINE TRIP
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H ₂ O
Coolant weight [t]	: 192
Operating coolant pressure [MPa]	: 15.41
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 285.1
Coolant mass flow at the rated power [t/h]	: 16276

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Superheated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 958
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.6
Design pressure difference [MPa]	: 0.85

Pressurizer

Total volume [m ³]	: 39.7
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 68000
Number of containment spray pumps	: 6
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: 0.178
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 17
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 136.2
LPSI system flowrate [t/h]	: 910

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.65
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 267.5
HP cylinder Inlet steam flow rate [t/h]	: 720

Main generator

Rated active power [MWe]	: 435
Rated apparent power [MVA]	: 540
Output voltage [kV]	: 18
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: 4
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 7.5
Steam generator feedwater inlet temperature [°C]	: 225

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9.4
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1650
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.173
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.35
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.2
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 42
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GDO2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.52
Reactor outlet temperature [°C]	: 324.7
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15176

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m2]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 39.6
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 12
LPSI system pressure [MPa]	: 2
HPSI system flowrate [t/h]	: 250
LPSI system flowrate [t/h]	: 470

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Available>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.4
HP cylinder Inlet steam moisture [%]	: <Not Available>
HP cylinder inlet steam temperature [°C]	: 268
HP cylinder Inlet steam flow rate [t/h]	: 1511

Main generator

Rated active power [MWe]	: 941
Rated apparent power [MVA]	: 1130
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: <Not Available>
Steam generator feedwater inlet temperature [°C]	: 225

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: <Not Available>
Number of on site non-safety related gas turbines	: <Not Available>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 35
Total battery capacity [Ah]	: <Not Available>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 800
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.985
Inside shell diameter [m]	: 3.998
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.35
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 84.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 96.45
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 16.47

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	:
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.52
Reactor outlet temperature [°C]	: 330.3
Reactor inlet temperature [°C]	: 293.6
Coolant mass flow at the rated power [t/h]	: 16566

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 45
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1604

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 70000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 12
LPSI system pressure [MPa]	: 2
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 7.28
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 291
HP cylinder Inlet steam flow rate [t/h]	: 1667

Main generator

Rated active power [MWe]	: 1054
Rated apparent power [MVA]	: 1300
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	: <Not Available>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 800
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA 508-CL-12
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304 INCONEL
Reactor vessel overall length/height [m]	: 11.89
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 170
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 35.1
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 2.47
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49.3
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 235
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 107.9
Average fuel power density [kW/kgU]	: 33
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.71
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 287.5
Coolant mass flow at the rated power [t/h]	: 16100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	:
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 4.27
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.05
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 275
HP cylinder Inlet steam flow rate [t/h]	: 3.85

Main generator

Rated active power [MWe]	: 684
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 20-MNMONI-55
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: STAB.AUSTH.STEEL
Reactor vessel overall length/height [m]	: 12.31
Inside shell diameter [m]	: 5.02
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.5
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.61
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.72
Average core power density [kW/dm ³]	: 93.17
Average fuel power density [kW/kgU]	: 36.4
Fuel linear heat generation rate [kW/m]	: 20.79

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.9
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	:
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 65
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	:

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 5.3
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.295
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284.5
HP cylinder Inlet steam flow rate [t/h]	: 7200

Main generator

Rated active power [MWe]	: 1309
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 2
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: 4
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1084
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

BG-5

KOZLODUY-5

BULGARIA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 15
Part of the core refuelled [%]	: 50
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.55
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 111
Average fuel power density [kW/kgU]	: 45.5
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 320
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 84000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 5980

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.55
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 111
Average fuel power density [kW/kgU]	: 45.5
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 320
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 84000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

CA-10

BRUCE-3

CANADA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 380
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8750
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 19
Average fuel power density [kW/kgU]	: 24
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9.36
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 43200

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.74
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.37
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 254
HP cylinder Inlet steam flow rate [t/h]	: 4450

Main generator

Rated active power [MWe]	: 825
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	:

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	:
Average discharge burnup [MWd/t]	: 8750
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 19
Average fuel power density [kW/kgU]	: 24
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	:
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 9.36
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 43200

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 1.74
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.37
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 254
HP cylinder Inlet steam flow rate [t/h]	: 4450

Main generator

Rated active power [MWe]	: 825
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7710
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 18.9
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9.49
Reactor outlet temperature [°C]	: 305
Reactor inlet temperature [°C]	: 257
Coolant mass flow at the rated power [t/h]	: 44000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.88
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 260
HP cylinder Inlet steam flow rate [t/h]	: 4933

Main generator

Rated active power [MWe]	: 915
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7710
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 18.9
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9.49
Reactor outlet temperature [°C]	: 305
Reactor inlet temperature [°C]	: 257
Coolant mass flow at the rated power [t/h]	: 44000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.88
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 260
HP cylinder Inlet steam flow rate [t/h]	: 4933

Main generator

Rated active power [MWe]	: 915
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7710
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 18.9
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9.49
Reactor outlet temperature [°C]	: 305
Reactor inlet temperature [°C]	: 257
Coolant mass flow at the rated power [t/h]	: 44000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.88
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 260
HP cylinder Inlet steam flow rate [t/h]	: 4933

Main generator

Rated active power [MWe]	: 915
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: 304L SS CALANDRIA
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.951
Inside shell diameter [m]	: 8.52
Shell thickness [mm]	: 31.7
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7710
Active core diameter [m]	: 5.67
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 119
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 18.9
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 24.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9.49
Reactor outlet temperature [°C]	: 305
Reactor inlet temperature [°C]	: 257
Coolant mass flow at the rated power [t/h]	: 9300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: ELEC-MECH
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.88
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 260
HP cylinder Inlet steam flow rate [t/h]	: 4933

Main generator

Rated active power [MWe]	: 915
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: ASME SA240 Type 304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: 5.029
Inside shell diameter [m]	: 8.458
Shell thickness [mm]	: 31.75
Number of pressure channels	: 480
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.23

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 8625
Active core diameter [m]	: 7.068
Active core height/length [m]	: 6.06
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 136.42
Moderator weight [t]	: 334.4
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.419
Average core power density [kW/dm ³]	: 11.91
Average fuel power density [kW/kgU]	: 46.62
Fuel linear heat generation rate [kW/m]	: 24

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gadolinium nitrate
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 220
Operating coolant pressure [MPa]	: 10
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 38412

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: 4
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: Carbon Steel
Drum separator shell material	: Carbon Steel
Design thermal capacity per SG [MW]	: 664
Design heat transfer surface [m ²]	: 4830

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 9.4
Design pressure difference [MPa]	: 1.9

Pressurizer

Total volume [m ³]	: 63.63
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1500

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.0965
Design leakage rate [% per day]	: 4.29
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 6
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.03
LPSI system pressure [MPa]	: 1.72
HPSI system flowrate [t/h]	: 1638
LPSI system flowrate [t/h]	: 6840

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 1

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.93
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 4710.56

Main generator

Rated active power [MWe]	: 936
Rated apparent power [MVA]	: 1101
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.2

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 5.07
Steam generator feedwater inlet temperature [°C]	: 176.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 4
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 4
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: 4
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 2 emergency power generators, gas turbines
Estimated time reserve of the batteries at full load [h]	: 0.5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.8
Total battery capacity [Ah]	: 3340

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 370944
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 5
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: 0.96

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: ASME SA240 Type 304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: 5.029
Inside shell diameter [m]	: 8.458
Shell thickness [mm]	: 31.75
Number of pressure channels	: 480
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.23

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 8625
Active core diameter [m]	: 7.068
Active core height/length [m]	: 6.06
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 136.42
Moderator weight [t]	: 334.4
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.419
Average core power density [kW/dm ³]	: 11.91
Average fuel power density [kW/kgU]	: 46.62
Fuel linear heat generation rate [kW/m]	: 24

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gadolinium nitrate
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 220
Operating coolant pressure [MPa]	: 10
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 38412

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: 4
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: Carbon Steel
Drum separator shell material	: Carbon Steel
Design thermal capacity per SG [MW]	: 664
Design heat transfer surface [m ²]	: 4830

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 9.4
Design pressure difference [MPa]	: 1.9

Pressurizer

Total volume [m ³]	: 63.63
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1500

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.0965
Design leakage rate [% per day]	: 4.29
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 6
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.03
LPSI system pressure [MPa]	: 1.72
HPSI system flowrate [t/h]	: 1638
LPSI system flowrate [t/h]	: 6840

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 1

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.93
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 4710.56

Main generator

Rated active power [MWe]	: 936
Rated apparent power [MVA]	: 1101
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.2

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 5.07
Steam generator feedwater inlet temperature [°C]	: 176.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 4
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 4
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: 4
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 2 emergency power generators, gas turbines
Estimated time reserve of the batteries at full load [h]	: 0.5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.8
Total battery capacity [Ah]	: 3340

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 370944
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 5
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Available>
Extraction steam pressure [MPa]	: 0.96

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: ASME SA240 Type 304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: 5.029
Inside shell diameter [m]	: 8.458
Shell thickness [mm]	: 31.75
Number of pressure channels	: 480
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.23

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 8625
Active core diameter [m]	: 7.068
Active core height/length [m]	: 6.06
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 136.42
Moderator weight [t]	: 334.4
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.419
Average core power density [kW/dm ³]	: 11.91
Average fuel power density [kW/kgU]	: 46.62
Fuel linear heat generation rate [kW/m]	: 24

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gadolinium nitrate
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 220
Operating coolant pressure [MPa]	: 10
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 38412

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: 4
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: Carbon Steel
Drum separator shell material	: Carbon Steel
Design thermal capacity per SG [MW]	: 664
Design heat transfer surface [m ²]	: 4830

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 9.4
Design pressure difference [MPa]	: 1.9

Pressurizer

Total volume [m ³]	: 63.63
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1500

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.0965
Design leakage rate [% per day]	: 4.29
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 6
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.03
LPSI system pressure [MPa]	: 1.72
HPSI system flowrate [t/h]	: 1638
LPSI system flowrate [t/h]	: 6840

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 1

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.93
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 4710.56

Main generator

Rated active power [MWe]	: 936
Rated apparent power [MVA]	: 1101
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.2

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 5.07
Steam generator feedwater inlet temperature [°C]	: 176.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 4
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 4
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: 4
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 2 emergency power generators, gas turbines
Estimated time reserve of the batteries at full load [h]	: 0.5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.8
Total battery capacity [Ah]	: 3340

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 370944
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 5
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Available>
Extraction steam pressure [MPa]	: 0.96

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: ASME SA240 Type 304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: 5.029
Inside shell diameter [m]	: 8.458
Shell thickness [mm]	: 31.75
Number of pressure channels	: 480
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.23

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 8625
Active core diameter [m]	: 7.068
Active core height/length [m]	: 6.06
Number of fissile fuel assemblies/bundles	: 6240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 136.42
Moderator weight [t]	: 334.4
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.419
Average core power density [kW/dm ³]	: 11.91
Average fuel power density [kW/kgU]	: 46.62
Fuel linear heat generation rate [kW/m]	: 24

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gadolinium nitrate
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 220
Operating coolant pressure [MPa]	: 10
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 38412

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: 4
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: Carbon Steel
Drum separator shell material	: Carbon Steel
Design thermal capacity per SG [MW]	: 664
Design heat transfer surface [m ²]	: 4830

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 9.4
Design pressure difference [MPa]	: 1.9

Pressurizer

Total volume [m ³]	: 63.63
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1500

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.0965
Design leakage rate [% per day]	: 4.29
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 6
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.03
LPSI system pressure [MPa]	: 1.72
HPSI system flowrate [t/h]	: 1638
LPSI system flowrate [t/h]	: 6840

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 1

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.93
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 4710.56

Main generator

Rated active power [MWe]	: 936
Rated apparent power [MVA]	: 1101
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.2

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 5.07
Steam generator feedwater inlet temperature [°C]	: 176.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 4
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 4
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: 4
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 2 emergency power generators, gas turbines
Estimated time reserve of the batteries at full load [h]	: 0.5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.8
Total battery capacity [Ah]	: 3340

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 370944
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 5
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Available>
Extraction steam pressure [MPa]	: 0.96

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ZR-NB
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 6.36
Inside shell diameter [m]	: 0.103
Shell thickness [mm]	: 13.175
Number of pressure channels	: 380
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: 4.343

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7000
Active core diameter [m]	: 7.69
Active core height/length [m]	: 6.06
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 65
Moderator weight [t]	: 255.67
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 12.9
Average fuel power density [kW/kgU]	: 80
Fuel linear heat generation rate [kW/m]	: 45.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: cadmium
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 207.5
Operating coolant pressure [MPa]	: 10.2
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 27720

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3177

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 5
Design pressure difference [MPa]	: 1.7

Pressurizer

Total volume [m ³]	: 45
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 48477
Number of containment spray pumps	: 1
Containment design pressure [MPa]	: 1.27
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 1
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.5
LPSI system pressure [MPa]	: 1.2
HPSI system flowrate [t/h]	: <Not Available>
LPSI system flowrate [t/h]	: <Not Available>

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.64
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 258
HP cylinder Inlet steam flow rate [t/h]	: 4000

Main generator

Rated active power [MWe]	: 685
Rated apparent power [MVA]	: 805.88
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Copper

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 5.481
Steam generator feedwater inlet temperature [°C]	: 186.9

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: 2
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 4
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 6
Number of on-site safety related gas turbines (available per unit)	: 4
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 6
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 11.9
Total battery capacity [Ah]	: 1800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 45000
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 12000

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 8.09
Shell thickness [mm]	: 114
Number of pressure channels	: -
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 9080
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4680
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 92.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 18.4
Fuel linear heat generation rate [kW/m]	: 26.6

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 6

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 542
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 8.09
Shell thickness [mm]	: 114
Number of pressure channels	: 380
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 9080
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 92.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 18.4
Fuel linear heat generation rate [kW/m]	: 26.6

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 6

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 542
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 26.8
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8330
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 90.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 19
Fuel linear heat generation rate [kW/m]	: 27.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249.5
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 26.8
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8330
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 90.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 19
Fuel linear heat generation rate [kW/m]	: 27.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249.5
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 26.8
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /PuO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8330
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 90.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 19
Fuel linear heat generation rate [kW/m]	: 27.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249.5
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 26.8
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8330
Active core diameter [m]	: 5.94
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 90.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 28
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 15.3
Average fuel power density [kW/kgU]	: 19
Fuel linear heat generation rate [kW/m]	: 27.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 9
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249.5
Coolant mass flow at the rated power [t/h]	: 27820

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 12
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 16
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.46
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 246
HP cylinder Inlet steam flow rate [t/h]	: 2930

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: ZR-NB
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.99
Inside shell diameter [m]	: 0.104
Shell thickness [mm]	: 4.34
Number of pressure channels	: 480
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8000
Active core diameter [m]	: 6.28
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 87.76
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 11.69
Average fuel power density [kW/kgU]	: 24.9
Fuel linear heat generation rate [kW/m]	: 59.5

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 11.55
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 27360

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.64
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 258
HP cylinder Inlet steam flow rate [t/h]	: 4100

Main generator

Rated active power [MWe]	: 680
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

CN-2

GUANGDONG-1

CHINA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 16- MND-5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L-309L
Reactor vessel overall length/height [m]	: 13.208
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 212
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 109
Average fuel power density [kW/kgU]	: 39.93
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.81
Reactor outlet temperature [°C]	: 327.6
Reactor inlet temperature [°C]	: 292.4
Coolant mass flow at the rated power [t/h]	: 68520

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.76
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.1
HP cylinder Inlet steam flow rate [t/h]	: 5810

Main generator

Rated active power [MWe]	: 983.8
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 16- MND-5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L-309L
Reactor vessel overall length/height [m]	: 13.208
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 212
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 109
Average fuel power density [kW/kgU]	: 39.93
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.81
Reactor outlet temperature [°C]	: 327.6
Reactor inlet temperature [°C]	: 292.4
Coolant mass flow at the rated power [t/h]	: 68520

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.76
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.1
HP cylinder Inlet steam flow rate [t/h]	: 5810

Main generator

Rated active power [MWe]	: 983.8
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: <Not Available>
Reactor vessel material specification	: -
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: -
Inside shell diameter [m]	: -
Shell thickness [mm]	: -
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: -
Fuel clad thickness [mm]	: -
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: -
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: <Not Available>
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: -
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: <Not Available>
Reactor vessel material specification	: -
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: -
Inside shell diameter [m]	: -
Shell thickness [mm]	: -
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: -
Fuel clad thickness [mm]	: -
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: -
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: <Not Available>
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.6
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: -
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: -
Reactor vessel centreline orientation	: -
Reactor vessel material	: -
Reactor vessel material specification	: -
Vessel cladding material	: -
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: -
Inside shell diameter [m]	: -
Shell thickness [mm]	: -
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: -
Fuel Form	: -
Fuel material	: -
Refuelling type	: -
Moderator material	: -
Fuel clad material	: -
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: -
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: -
Fuel clad thickness [mm]	: -
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: -
Burnable neutron absorber material	: -
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: -
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: -
Coolant type	: -
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: -
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: -
SG output	: -
Number of SG	: -
Number of drum separators	: -
Tube shape	: -
Tube material	: -
SG shell material	: -
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: -
Number of pumps per RCS loop	: -
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: -
Number of safety valves	: -
Number of relief valves	: -
Installed heater power [kW]	: -

Containment systems

Containment type	: -
Containment Shape	: -
Containment structure	: -
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: -
Number of LPSI systems	: -
Number of hydroaccumulators	: -
Number of core spray system pumps (BWR)	: -
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: -

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: -

Secondary systems

Turbine

Turbine type	: -
Number of turbine-generators per unit/reactor	: -
Turbine speed [rpm]	: -
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: -
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: -
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: -
Number of condensers per turbine-generator	: -
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: -
Number of motor-driven main feedwater pumps	: -
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: -
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: -
Number of diesel driven pumps	: -
Number of turbine driven pumps	: -

Fire protection system

On-site fire suppression/extinguishing system	: -
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: -
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: -
Number of on-site safety related diesel generators (available per unit)	: -
Number of on-site safety related gas turbines (available per unit)	: -
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: -
Interim storage facility type	: -
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: -
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Number of heat connection points per unit	: -
Number of intermediate circuits/heat exchangers	: -
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-111
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L
Reactor vessel overall length/height [m]	: 10.705
Inside shell diameter [m]	: 3.382
Shell thickness [mm]	: 175
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.4
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 2.486
Active core height/length [m]	: 2.9
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 40.746
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 68.6
Average fuel power density [kW/kgU]	: 26.9
Fuel linear heat generation rate [kW/m]	: 13.5

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: GG-17
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 14.6
Operating coolant pressure [MPa]	: 15.2
Reactor outlet temperature [°C]	: 308.5
Reactor inlet temperature [°C]	: 281.5
Coolant mass flow at the rated power [t/h]	: 24000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	: S271
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 484
Design heat transfer surface [m ²]	: 3077

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.2
Design pressure difference [MPa]	: 0.74

Pressurizer

Total volume [m ³]	: 35
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1350

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 49000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 2.65
Design leakage rate [% per day]	: 0.22
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 75
LPSI system flowrate [t/h]	: 450

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 268.1
HP cylinder Inlet steam flow rate [t/h]	: 1866

Main generator

Rated active power [MWe]	: 310
Rated apparent power [MVA]	: 364.7
Output voltage [kV]	: 18
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.9

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.4
Steam generator feedwater inlet temperature [°C]	: 215

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: 1
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 2
Total battery capacity [Ah]	: 2000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1026
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: 16MND5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L
Reactor vessel overall length/height [m]	: 12.978
Inside shell diameter [m]	: 3.84
Shell thickness [mm]	: 205
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: 2.67
Active core height/length [m]	: 3.6576
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 63.283
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 94.30
Average fuel power density [kW/kgU]	: 34.71
Fuel linear heat generation rate [kW/m]	: 16.09

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 160
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 315.2
Reactor inlet temperature [°C]	: 288.8
Coolant mass flow at the rated power [t/h]	: 24290

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCOLOY-690
SG shell material	: SA-508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 968
Design heat transfer surface [m2]	: 5630

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.236
Design pressure difference [MPa]	: 0.91

Pressurizer

Total volume [m3]	: 27
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1440

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 50637
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: .45
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.67
LPSI system pressure [MPa]	: 1.00
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 680

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.41
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 279.9
HP cylinder Inlet steam flow rate [t/h]	: 3862

Main generator

Rated active power [MWe]	: 650
Rated apparent power [MVA]	: 650
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 11.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.6
Steam generator feedwater inlet temperature [°C]	: 316

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Applicable>
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: <Not Applicable>
Total installed capacity of the on-site emergency power sources per unit [MW]	: <Not Applicable>
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 690
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 16MND5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L
Reactor vessel overall length/height [m]	: 12.978
Inside shell diameter [m]	: 3.84
Shell thickness [mm]	: 205
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: 2.67
Active core height/length [m]	: 3.6576
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 63.283
Moderator weight [t]	: <Not Applicable>
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 94.30
Average fuel power density [kW/kgU]	: 34.71
Fuel linear heat generation rate [kW/m]	: 16.09

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 160
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 315.2
Reactor inlet temperature [°C]	: 288.8
Coolant mass flow at the rated power [t/h]	: 24000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-690
SG shell material	: SA-508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 968
Design heat transfer surface [m ²]	: 5630

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.236
Design pressure difference [MPa]	: 0.91

Pressurizer

Total volume [m ³]	: 27
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1440

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 50637
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.450
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.67
LPSI system pressure [MPa]	: 1.00
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 680

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.41
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 279.9
HP cylinder Inlet steam flow rate [t/h]	: 3862

Main generator

Rated active power [MWe]	: 650
Rated apparent power [MVA]	: 650
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 11.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.6
Steam generator feedwater inlet temperature [°C]	: 316

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: <Not Applicable>
Total installed capacity of the on-site emergency power sources per unit [MW]	: <Not Applicable>
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 690
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: 16MND5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L
Reactor vessel overall length/height [m]	: 12.978
Inside shell diameter [m]	: 3.84
Shell thickness [mm]	: 205
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: <Not Available>
Active core diameter [m]	: 2.67
Active core height/length [m]	: 3.6576
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 63.283
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 94.30
Average fuel power density [kW/kgU]	: 34.71
Fuel linear heat generation rate [kW/m]	: 16.09

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 160
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 315.2
Reactor inlet temperature [°C]	: 288.8
Coolant mass flow at the rated power [t/h]	: 24290

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	:
Tube material	: INCOLOY-690
SG shell material	: SA-508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 968
Design heat transfer surface [m ²]	: 5630

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.236
Design pressure difference [MPa]	: 0.91

Pressurizer

Total volume [m ³]	: 27
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1440

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 50637
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: .45
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.67
LPSI system pressure [MPa]	: 1.00
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 680

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.41
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 279.9
HP cylinder Inlet steam flow rate [t/h]	: 3862

Main generator

Rated active power [MWe]	: 650
Rated apparent power [MVA]	: 650
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 11.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 8.6
Steam generator feedwater inlet temperature [°C]	: 316

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Applicable>
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: <Not Applicable>
Total installed capacity of the on-site emergency power sources per unit [MW]	: <Not Applicable>
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 690
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: -
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Number of heat connection points per unit	: -
Number of intermediate circuits/heat exchangers	: -
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7.8
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.2

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: 60
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7186
Active core diameter [m]	: 6.28
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 24.01
Moderator weight [t]	: 264
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: <Not Available>
Average fuel power density [kW/kgU]	: 23.5
Fuel linear heat generation rate [kW/m]	: 25.35

Reactivity control

Control rod material	: Other - Stainless Steel/ G
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: Nitrogen Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 196
Operating coolant pressure [MPa]	: 9.89
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 27720

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: Inco-800
SG shell material	: CS
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Available>
Design heat transfer surface [m2]	: <Not Available>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.71
Design pressure difference [MPa]	: 1.83

Pressurizer

Total volume [m3]	: 45.3
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Other - Dousing ;LAC
Additional pressure suppression system	: Water Condenser

Total containment volume [m ³]	: 48654
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.124
Design leakage rate [% per day]	: <Not Applicable>
Type of H ₂ recombiner	: Active + Passive

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.72
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: <Not Available>

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: -
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 43440
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Available>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Available>
Extraction steam pressure [MPa]	: 4.51

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7.8
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.2

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: 60
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7186
Active core diameter [m]	: 6.28
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 24.01
Moderator weight [t]	: 264
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: <Not Available>
Average fuel power density [kW/kgU]	: 23.5
Fuel linear heat generation rate [kW/m]	: 25.35

Reactivity control

Control rod material	: Other - Stainless Steel/ G
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: Nitrogen Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 196
Operating coolant pressure [MPa]	: 9.89
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 27720

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: Inco-800
SG shell material	: CS
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Available>
Design heat transfer surface [m2]	: <Not Available>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.71
Design pressure difference [MPa]	: 1.83

Pressurizer

Total volume [m3]	: 45.3
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Other - Dousing ;LAC
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 48654
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.124
Design leakage rate [% per day]	: <Not Applicable>
Type of H2 recombiner	: Active + Passive

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.72
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 2
Number of IP cylinders per turbine	: 1
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.51
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 258
HP cylinder Inlet steam flow rate [t/h]	: 3568

Main generator

Rated active power [MWe]	: 728
Rated apparent power [MVA]	: 817
Output voltage [kV]	: 22
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.5
Steam generator feedwater inlet temperature [°C]	: 187

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: <Not Available>
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: <Not Available>
Total installed capacity of the on-site emergency power sources per unit [MW]	: 1.280
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 43440
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: <Not Available>
Extraction steam pressure [MPa]	: 4.51

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: <Not Available>
Refuelling type	: OFF-line
Moderator material	: H2O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 0.7
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	:
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	:
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 0.7
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	:
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	:
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

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Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr+1%Nb
Average fuel enrichment [% of U235]	: 4.3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.4
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 240
Operating coolant pressure [MPa]	: 12.26
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 31870

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 1.5
Design leakage rate [% per day]	: 13
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.3
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1356

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1049
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4053

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr+1%Nb
Average fuel enrichment [% of U235]	: 4.3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.4
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 240
Operating coolant pressure [MPa]	: 12.26
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 31870

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 1.5
Design leakage rate [% per day]	: 13
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.3
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1356

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1049
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4053

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr+1%Nb
Average fuel enrichment [% of U235]	: 4.3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.8
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 240
Operating coolant pressure [MPa]	: 12.26
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 31870

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 1.5
Design leakage rate [% per day]	: 13
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.3
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1356

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1049
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4053

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr+1%Nb
Average fuel enrichment [% of U235]	: 4.3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.4
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 240
Operating coolant pressure [MPa]	: 12.26
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 31870

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 1.5
Design leakage rate [% per day]	: 13
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.3
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1356

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1049
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4053

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRCALLOY-4
Average fuel enrichment [% of U235]	: 3.6
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25.7
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.63
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 91.75
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 105.5
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 16.3

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al ₂ O ₃ -B ₄ C
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H ₂ O
Coolant weight [t]	: 330
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 64483

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 750
Design heat transfer surface [m ²]	: 6111

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 6.8
Design pressure difference [MPa]	: 0.67

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 60000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 4.6
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 11.4
LPSI system pressure [MPa]	: 2.26
HPSI system flowrate [t/h]	: 50
LPSI system flowrate [t/h]	: 800

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.2
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 278
HP cylinder Inlet steam flow rate [t/h]	: 5877

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: 1200
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRCALLOY-4
Average fuel enrichment [% of U235]	: 3.6
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25.7
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.63
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 91.75
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 105.5
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 16.3

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al ₂ O ₃ -B ₄ C
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H ₂ O
Coolant weight [t]	: 330
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 64483

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 750
Design heat transfer surface [m ²]	: 6111

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 6.8
Design pressure difference [MPa]	: 0.67

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 60000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 4.6
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 11.4
LPSI system pressure [MPa]	: 2.26
HPSI system flowrate [t/h]	: 50
LPSI system flowrate [t/h]	: 800

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.2
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 278
HP cylinder Inlet steam flow rate [t/h]	: 5877

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: 1200
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: dry
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: 3.9
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 313
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 105.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 15.6

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 180
Operating coolant pressure [MPa]	: 12.25
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 30600

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.1
Design pressure difference [MPa]	: 0.43

Pressurizer

Total volume [m3]	: 37.8
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Ice Condenser

Total containment volume [m3]	: 74700
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.75
Design leakage rate [% per day]	: 0.2
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.5
LPSI system pressure [MPa]	: 1.1
HPSI system flowrate [t/h]	: 374
LPSI system flowrate [t/h]	: 1584

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 372

Main generator

Rated active power [MWe]	: 260
Rated apparent power [MVA]	: 235
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 2.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 228

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 485
Interim storage facility type	: Other - N/A
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: 2
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 313
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 105.6
Average fuel power density [kW/kgU]	: 40.2
Fuel linear heat generation rate [kW/m]	: 15.7

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 180
Operating coolant pressure [MPa]	: 12.25
Reactor outlet temperature [°C]	: 298.5
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 31850

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.1
Design pressure difference [MPa]	: 0.43

Pressurizer

Total volume [m ³]	: 37.8
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Ice Condenser

Total containment volume [m3]	: 74700
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.75
Design leakage rate [% per day]	: 0.2
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 12.5
LPSI system pressure [MPa]	: 1.1
HPSI system flowrate [t/h]	: 374
LPSI system flowrate [t/h]	: 1584

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: 0.2
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 372

Main generator

Rated active power [MWe]	: 260
Rated apparent power [MVA]	: 235
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 2.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 228

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 485
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 4618

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: 2
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASME-533-B/508-CL-2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 20.6
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 139
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.63
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 3.88
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 500
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 86.9
Moderator weight [t]	: <Not Applicable>
Number of fuel elements per assembly/bundle	: 81
Fuel clad thickness [mm]	: 0.8
Average core power density [kW/dm ³]	: 57.5
Average fuel power density [kW/kgU]	: 28.6
Fuel linear heat generation rate [kW/m]	: 14.9

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 121

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	: <Not Applicable>
Operating coolant pressure [MPa]	: 7.12
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 28000

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 0.62
Design pressure difference [MPa]	: 0.19

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 10290
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 4.8
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 4
HPSI systems pressure [MPa]	: 8.5
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: 81
LPSI system flowrate [t/h]	: 468

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 4
HP cylinder inlet steam pressure [MPa]	: 6.7
HP cylinder Inlet steam moisture [%]	: 0.01
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 980

Main generator

Rated active power [MWe]	: 855
Rated apparent power [MVA]	: 950
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 8.2
Steam generator feedwater inlet temperature [°C]	: 184

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: <Not Applicable>
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8
Total battery capacity [Ah]	: 22000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1520
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 3573

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASME-533-B/508-CL-2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 20.6
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 139
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.47
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 3.88
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 500
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: <Not Applicable>
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.8
Average core power density [kW/dm ³]	: 57.5
Average fuel power density [kW/kgU]	: 29.5
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 121

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	: <Not Applicable>
Operating coolant pressure [MPa]	: 7.12
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 28000

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 0.62
Design pressure difference [MPa]	: 0.19

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 10290
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 4.8
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 4
HPSI systems pressure [MPa]	: 8.5
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: 81
LPSI system flowrate [t/h]	: 468

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 4
HP cylinder inlet steam pressure [MPa]	: 6.7
HP cylinder Inlet steam moisture [%]	: 0.30
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 980

Main generator

Rated active power [MWe]	: 814.5
Rated apparent power [MVA]	: 905
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 4
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 8.5
Steam generator feedwater inlet temperature [°C]	: 184

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: <Not Applicable>
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 5
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8
Total battery capacity [Ah]	: 22000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1560
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 3573

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

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BELLEVILLE-1

FRANCE

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.25
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.2
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Carbon Steel
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 51

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	:
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m ³]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	:
Type of H ₂ recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.25
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.2
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 50000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 50000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 50000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 50000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.46
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15892

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.46
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15892

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15892

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 933
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: FS ALLOYED WITH MN-MO-NI
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15892

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 933
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7060

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7060

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7060

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7060

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.32
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 38

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 22500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 924
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.32
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 38

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 22500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 924
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.32
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 38

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 22500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 1040
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.32
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 38

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 22500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 1040
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 16 MNO5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: INOX 24/12
Reactor vessel overall length/height [m]	: 12.6
Inside shell diameter [m]	: 4.5
Shell thickness [mm]	: 225
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 205
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 125
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 274
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105.2
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 17.92

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORATE GLASS
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 329.5
Reactor inlet temperature [°C]	: 292.2
Coolant mass flow at the rated power [t/h]	: 69840

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 287
HP cylinder Inlet steam flow rate [t/h]	: 8650

Main generator

Rated active power [MWe]	: 1450
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 16 MNO5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: INOX 24/12
Reactor vessel overall length/height [m]	: 12.6
Inside shell diameter [m]	: 4.5
Shell thickness [mm]	: 225
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 205
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 125
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105.2
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 17.92

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORATE GLASS
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 329.5
Reactor inlet temperature [°C]	: 292.2
Coolant mass flow at the rated power [t/h]	: 69840

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 287
HP cylinder Inlet steam flow rate [t/h]	: 8650

Main generator

Rated active power [MWe]	: 1450
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: INOX 24/12
Reactor vessel overall length/height [m]	: 12.6
Inside shell diameter [m]	: 4.5
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 205
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 125
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 274
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 17

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 329.5
Reactor inlet temperature [°C]	: 292.2
Coolant mass flow at the rated power [t/h]	: 2350

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 287
HP cylinder Inlet steam flow rate [t/h]	: 8650

Main generator

Rated active power [MWe]	: 1450
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.6
Inside shell diameter [m]	: 4.5
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 205
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 125
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 274
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 329.5
Reactor inlet temperature [°C]	: 292.2
Coolant mass flow at the rated power [t/h]	: 2350

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 287
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 1450
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 928
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 963
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 963
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 928
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 942
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 942
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 942
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.61
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 942
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 14
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.46
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 60300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.257
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 923
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.46
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 332
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 60300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.257
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 5500

Main generator

Rated active power [MWe]	: 923
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7060

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 255.3
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 289.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.3
Inside shell diameter [m]	: 3.987
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.2
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 47700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.5
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.3
Inside shell diameter [m]	: 3.987
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.2
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 47700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.5
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15890

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-503-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15890

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 13.6
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 111.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 293.4
Coolant mass flow at the rated power [t/h]	: 16700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.05
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 13.6
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 111.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 293.4
Coolant mass flow at the rated power [t/h]	: 16700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1321
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 91000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 91000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 91000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 91000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 804
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95.8
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 292.8
Coolant mass flow at the rated power [t/h]	: 16420

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7855

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS316
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 12
Shell thickness [mm]	: 15
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂ /PuO ₂
Refuelling type	: OFF-line
Moderator material	: <Not Applicable>
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS 1515TI
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 5
Part of the core refuelled [%]	: 15
Average discharge burnup [MWd/t]	: 100000
Active core diameter [m]	: 1.39
Active core height/length [m]	: 0.85
Number of fissile fuel assemblies/bundles	: 103
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: -
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 217
Fuel clad thickness [mm]	: 0.45
Average core power density [kW/dm ³]	: 406
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: Na
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 1
Reactor outlet temperature [°C]	: 530
Reactor inlet temperature [°C]	: 380
Coolant mass flow at the rated power [t/h]	: 3600

Steam generators (SG)/drum separators

Type of SG	: Modular
SG output	: Superheated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Rectangular
Containment structure	: <Not Available>
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.04
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: <Not Applicable>
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: <Not Applicable>
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: 1
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 520
HP cylinder Inlet steam flow rate [t/h]	: 790

Main generator

Rated active power [MWe]	: 250
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Brass

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.3
Reactor inlet temperature [°C]	: 293.1
Coolant mass flow at the rated power [t/h]	: 65600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.6
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.267
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 36.68
Fuel linear heat generation rate [kW/m]	: 17.2

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 328.3
Reactor inlet temperature [°C]	: 293.1
Coolant mass flow at the rated power [t/h]	: 65600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 7772

Main generator

Rated active power [MWe]	: 1335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 928
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5455

Main generator

Rated active power [MWe]	: 928
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 4.003
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 33735
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 15894

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269.9
HP cylinder Inlet steam flow rate [t/h]	: 5450

Main generator

Rated active power [MWe]	: 957
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: 5-CR-NI-NB-199 (1.4551)
Reactor vessel overall length/height [m]	: 13.251
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 242
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 33500
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102.7
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.78
Average core power density [kW/dm ³]	: 87
Average fuel power density [kW/kgU]	: 34.3
Fuel linear heat generation rate [kW/m]	: 19.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 69

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 317
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 72000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	:
Design thermal capacity per SG [MW]	: 885
Design heat transfer surface [m2]	: 4510

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 8.555
Design pressure difference [MPa]	: 0.65

Pressurizer

Total volume [m3]	: 85
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 4500

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.47
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.1
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 267.6
HP cylinder Inlet steam flow rate [t/h]	: 6680

Main generator

Rated active power [MWe]	: 1147
Rated apparent power [MVA]	: 1500
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: 5-CR-NI-NB-199 (1.4551)
Reactor vessel overall length/height [m]	: 13.25
Inside shell diameter [m]	: 5.014
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.1
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 31500
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102.7
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.78
Average core power density [kW/dm ³]	: 92.3
Average fuel power density [kW/kgU]	: 36.7
Fuel linear heat generation rate [kW/m]	: 20.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 72000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 938
Design heat transfer surface [m2]	: 4335

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 8.555
Design pressure difference [MPa]	: 0.67

Pressurizer

Total volume [m3]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2100

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.47
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.3
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 7160

Main generator

Rated active power [MWe]	: 1238
Rated apparent power [MVA]	: 1530
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 2603

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: 10-CR-NI-NB-189 (1.4550)
Reactor vessel overall length/height [m]	: 12.670
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 256
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 71
Average discharge burnup [MWd/t]	: 34000
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 93
Average fuel power density [kW/kgU]	: 36.4
Fuel linear heat generation rate [kW/m]	: 20.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: In, AG, Cd
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m ²]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.63
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.7
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 1927

Main generator

Rated active power [MWe]	: 1383
Rated apparent power [MVA]	: 1640
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 768
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 1900

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-D-2 (22 NiMoCo 37)
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: X10-CR-NI-NB-18.9
Reactor vessel overall length/height [m]	: 20.7
Inside shell diameter [m]	: 5.58
Shell thickness [mm]	: 141
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.7
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	:
Average discharge burnup [MWd/t]	: 27500
Active core diameter [m]	: 3.696
Active core height/length [m]	: 3.97
Number of fissile fuel assemblies/bundles	: 532
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 96
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 49
Fuel clad thickness [mm]	: 0.82
Average core power density [kW/dm ³]	: 50.6
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 23.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 129

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.9
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 215
Coolant mass flow at the rated power [t/h]	: 7756

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.45
Design leakage rate [% per day]	: 1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 4.11
LPSI system pressure [MPa]	: 0.26
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.67
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 1140

Main generator

Rated active power [MWe]	: 806
Rated apparent power [MVA]	: 1006
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.0

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4160

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 20-MNMONI-55; 22-NiMoCr-37
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: 10-CR-NI-NB-18.9
Reactor vessel overall length/height [m]	: 12.3
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 256
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 32000
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 300
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 93.0
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 16.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m ²]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.62
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.05
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 277
HP cylinder Inlet steam flow rate [t/h]	: 6958.8

Main generator

Rated active power [MWe]	: 1314
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 768
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 2470

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 256
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 11
Part of the core refuelled [%]	: 28
Average discharge burnup [MWd/t]	: 34000
Active core diameter [m]	: 3.8
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 93.0
Average fuel power density [kW/kgU]	: 36.53
Fuel linear heat generation rate [kW/m]	: 20.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 329
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m2]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 7.4
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.53
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.64
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7400

Main generator

Rated active power [MWe]	: 1345
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: 35
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 8.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 715
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 1672

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 308L-309L
Reactor vessel overall length/height [m]	: 12.82
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/DUPLEX
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 75
Average discharge burnup [MWd/t]	: 34000
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 93.0
Average fuel power density [kW/kgU]	: 36.37
Fuel linear heat generation rate [kW/m]	: 21.2

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325.3
Reactor inlet temperature [°C]	: 292.1
Coolant mass flow at the rated power [t/h]	: 72580

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 967
Design heat transfer surface [m ²]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 7.350
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.53
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 285.3
HP cylinder Inlet steam flow rate [t/h]	: 7488

Main generator

Rated active power [MWe]	: 1360
Rated apparent power [MVA]	: 1640
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.6

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 768
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 1900

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-11; 22-NI-MO-CR-37 (1.6751)
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: GE- (1.4551), 5-CR-NI-NB-199 (1.4551)
Reactor vessel overall length/height [m]	: 22.35
Inside shell diameter [m]	: 6.62
Shell thickness [mm]	: 171
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.8
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 18
Average discharge burnup [MWd/t]	: 27500
Active core diameter [m]	: 4.818
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 784
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 136.6
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.605
Average core power density [kW/dm ³]	: 56.8
Average fuel power density [kW/kgU]	: 28.3
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 193

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 51480

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.35
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.58
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6966

Main generator

Rated active power [MWe]	: 1310
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3210
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-11; 22-NI-MO-CR-37 (1.6751)
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: GE- (1.4551), 5-CR-NI-NB-199 (1.4551)
Reactor vessel overall length/height [m]	: 22.35
Inside shell diameter [m]	: 6.62
Shell thickness [mm]	: 171
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.8
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 27500
Active core diameter [m]	: 4.818
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 784
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 137.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 56.8
Average fuel power density [kW/kgU]	: 28.3
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 193

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 51480

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: <Not Applicable>
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.42
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.58
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6966

Main generator

Rated active power [MWe]	: 1310
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3210
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 9984

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-CL-1, 22-NI-MO-CR-37 (1.6751)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 20.7
Inside shell diameter [m]	: 5.85
Shell thickness [mm]	: 148
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.7
Refuelling frequency [month]	: 11
Part of the core refuelled [%]	: 27
Average discharge burnup [MWd/t]	: 27500
Active core diameter [m]	: 4.18
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 100
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 63
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 50.4
Average fuel power density [kW/kgU]	: 22.5
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 215
Coolant mass flow at the rated power [t/h]	: 5010

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: <Not Available>
Number of containment spray pumps	: <Not Available>
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4650

Main generator

Rated active power [MWe]	: 907
Rated apparent power [MVA]	: 1070
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 20-MNMONI-55; '22 NiMoCr 37
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.010
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 32000
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 300
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 93.0
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 16.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m ²]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 72000
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.52
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 6.3
LPSI system pressure [MPa]	: 0.68
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.43
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 278
HP cylinder Inlet steam flow rate [t/h]	: 1850

Main generator

Rated active power [MWe]	: 1370
Rated apparent power [MVA]	: 1640
Output voltage [kV]	: 35
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 8.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 768
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.85
Inside shell diameter [m]	: 6.7
Shell thickness [mm]	: 168
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.8
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	:
Average discharge burnup [MWd/t]	: 27500
Active core diameter [m]	: 3.708
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 840
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 152.4
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.82
Average core power density [kW/dm ³]	: 51.8
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 18.0

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 205

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 55600

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 10
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 11260
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.50
Design leakage rate [% per day]	: 1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 3.4
LPSI system pressure [MPa]	: 0.6
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 1849

Main generator

Rated active power [MWe]	: 1316
Rated apparent power [MVA]	: 1530
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1582
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 4160

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NIMOCR-37
Vessel cladding material	: <Not Available>
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 10.9
Inside shell diameter [m]	: 4.358
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 37500
Active core diameter [m]	: 3.24
Active core height/length [m]	: 2.985
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 63
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 205
Fuel clad thickness [mm]	: 0.72
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 22.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 320.2
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 51282

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Available>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	:
Design thermal capacity per SG [MW]	: 837
Design heat transfer surface [m2]	: 4005

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 45
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1500

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 4.6
Design leakage rate [% per day]	: 1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 5
Number of LPSI systems	: 5
Number of hydroaccumulators	: 6
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 4
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 2
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 4
HP cylinder inlet steam pressure [MPa]	: 5.79
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 1116.215

Main generator

Rated active power [MWe]	: 855
Rated apparent power [MVA]	: 850
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	:	
Number of main condensate pumps required for full power	:	
Condenser vacuum at the full power (absolute pressure) [kPa]	:	5.641

Feedwater system

Number of turbine driven main feedwater pumps	:	<Not Available>
Number of motor-driven main feedwater pumps	:	<Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	:	<Not Available>
Number of feedwater pumps required for full power operation	:	
Feedwater discharge pressure [MPa]	:	
Steam generator feedwater inlet temperature [°C]	:	

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	:	<Not Available>
Number of diesel driven pumps	:	<Not Available>
Number of turbine driven pumps	:	<Not Available>

Fire protection system

On-site fire suppression/extinguishing system	:	<Not Available>
Fire retardant cable coating used for	:	
Cable segregation within the unit used for	:	
On-site fire brigade	:	
Off-site fire brigade response time	:	

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	:	<Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	:	<Not Available>
Number of on-site safety related diesel generators (available per unit)	:	<Not Available>
Number of on-site safety related gas turbines (available per unit)	:	<Not Available>
Number of on site non-safety related diesel generator	:	
Number of on site non-safety related gas turbines	:	
Other on-site emergency AC power sources	:	
Estimated time reserve of the batteries at full load [h]	:	
Total installed capacity of the on-site emergency power sources per unit [MW]	:	
Total battery capacity [Ah]	:	

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	:	118
Interim storage facility type	:	Dry
Interim storage facility capacity (number of spent fuel assemblies)	:	

Non-electrical applications

Primary heat connection	:	<Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 20-MNMONI-55
Vessel cladding material	: <Not Available>
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 256
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 2.0
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 23
Average discharge burnup [MWd/t]	: 46000
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 300
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 93
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 16.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325.6
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	:
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m2]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 72000
Number of containment spray pumps	:
Containment design pressure [MPa]	: 5.2
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: 6.3
LPSI system pressure [MPa]	: 0.95
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.23
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 279.3
HP cylinder Inlet steam flow rate [t/h]	: 2045

Main generator

Rated active power [MWe]	: 1316
Rated apparent power [MVA]	: 1640
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	:	
Number of main condensate pumps required for full power	:	
Condenser vacuum at the full power (absolute pressure) [kPa]	:	8.9

Feedwater system

Number of turbine driven main feedwater pumps	:	<Not Available>
Number of motor-driven main feedwater pumps	:	<Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	:	<Not Available>
Number of feedwater pumps required for full power operation	:	
Feedwater discharge pressure [MPa]	:	
Steam generator feedwater inlet temperature [°C]	:	

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	:	<Not Available>
Number of diesel driven pumps	:	<Not Available>
Number of turbine driven pumps	:	<Not Available>

Fire protection system

On-site fire suppression/extinguishing system	:	<Not Available>
Fire retardant cable coating used for	:	
Cable segregation within the unit used for	:	
On-site fire brigade	:	
Off-site fire brigade response time	:	

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	:	<Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	:	<Not Available>
Number of on-site safety related diesel generators (available per unit)	:	<Not Available>
Number of on-site safety related gas turbines (available per unit)	:	<Not Available>
Number of on site non-safety related diesel generator	:	
Number of on site non-safety related gas turbines	:	
Other on-site emergency AC power sources	:	
Estimated time reserve of the batteries at full load [h]	:	
Total installed capacity of the on-site emergency power sources per unit [MW]	:	
Total battery capacity [Ah]	:	

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	:	768
Interim storage facility type	:	Dry
Interim storage facility capacity (number of spent fuel assemblies)	:	2968

Non-electrical applications

Primary heat connection	:	<Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-508-CL-1; 22-NI-MO-CR-37 (1.6751)
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: 5-CR-NI-NB-199 (1.4551)
Reactor vessel overall length/height [m]	: 21.276
Inside shell diameter [m]	: 5.85
Shell thickness [mm]	: 147
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.7
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20.5
Average discharge burnup [MWd/t]	: 17900
Active core diameter [m]	: 4.5
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102.8
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 63
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 51.1
Average fuel power density [kW/kgU]	: 22.3
Fuel linear heat generation rate [kW/m]	: 24.2

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.9
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 215
Coolant mass flow at the rated power [t/h]	: 37300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 9
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.41
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.23
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 5010

Main generator

Rated active power [MWe]	: 900
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: NIMOCR-ST; 22 NiMoCr 37
Vessel cladding material	: <Not Available>
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 12.7
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 256
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.605
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 93
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 20.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 63619

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 946
Design heat transfer surface [m ²]	: 5400

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2142

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 72000
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.52
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 6.3
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.13
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 2055

Main generator

Rated active power [MWe]	: 1349
Rated apparent power [MVA]	: 1560
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 768
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AS
Reactor vessel overall length/height [m]	: 13.247
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.3
Refuelling frequency [month]	: 11
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 35400
Active core diameter [m]	: 3.6
Active core height/length [m]	: 3.9
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	: 92.3
Average fuel power density [kW/kgU]	: 36.7
Fuel linear heat generation rate [kW/m]	: 20.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 70600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 938
Design heat transfer surface [m2]	: 4335

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 65
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2100

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: Spray

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 0.47
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 8
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.42
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 279
HP cylinder Inlet steam flow rate [t/h]	: 6803

Main generator

Rated active power [MWe]	: 1345
Rated apparent power [MVA]	: 1535
Output voltage [kV]	: 27
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 615
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 1520

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: 3.6
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 41.9
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 85.2
Average fuel power density [kW/kgU]	: 32
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 210
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39750

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08H18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 2.5
Design leakage rate [% per day]	: 14.6
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.2
HP cylinder Inlet steam moisture [%]	: 0.05
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1467

Main generator

Rated active power [MWe]	: 255
Rated apparent power [MVA]	: 265
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 7.8
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.8
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1052
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 7200

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 4
Total capacity of heat connections [MWt]	: 37
Extraction steam pressure [MPa]	: 0.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: 3.82
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 41.9
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 85.2
Average fuel power density [kW/kgU]	: 32
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39450

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 2.5
Design leakage rate [% per day]	: 14.7
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.315
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1467

Main generator

Rated active power [MWe]	: 255
Rated apparent power [MVA]	: 265
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.8
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1029
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 4
Total capacity of heat connections [MWt]	: 37
Extraction steam pressure [MPa]	: 0.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: 3.82
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 41.9
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 85.2
Average fuel power density [kW/kgU]	: 32
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 210
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 40600

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 2.5
Design leakage rate [% per day]	: 14.7
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1467

Main generator

Rated active power [MWe]	: 230
Rated apparent power [MVA]	: 255
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1029
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 4
Total capacity of heat connections [MWt]	: 37
Extraction steam pressure [MPa]	: 0.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: 3.82
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 37000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.42
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 41.9
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 85.2
Average fuel power density [kW/kgU]	: 32
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: 210
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 297
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 40300

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.4
Design pressure difference [MPa]	: 0.425

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: 51322
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 2.5
Design leakage rate [% per day]	: 14.7
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 12.7
LPSI system pressure [MPa]	: 0.71
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 280

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1467

Main generator

Rated active power [MWe]	: 230
Rated apparent power [MVA]	: 255
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 3
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.8
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1029
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 4
Total capacity of heat connections [MWt]	: 37
Extraction steam pressure [MPa]	: 0.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.73
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.73
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: -
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: <Not Available>
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: -
Active core height/length [m]	: -
Number of fissile fuel assemblies/bundles	: -
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: -
Fuel clad thickness [mm]	: -
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 1.5
Reactor outlet temperature [°C]	: -
Reactor inlet temperature [°C]	: -
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: <Not Available>
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: <Not Available>
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: -
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6500
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 29.57

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: 0
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.25
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6500
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 29.57

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: 0
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.25
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 18.1
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.5
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 12100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1336

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 18.1
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.5
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 12100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1336

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 4.645
Inside shell diameter [m]	: 5.996
Shell thickness [mm]	: 25
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 15000
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 18.1
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 12700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.25
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1336

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 4.645
Inside shell diameter [m]	: 5.996
Shell thickness [mm]	: 25
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 15000
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 18.1
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293.4
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 12700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.25
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1336

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 8.23
Average fuel power density [kW/kgU]	: 15.8
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 11.6
Reactor outlet temperature [°C]	: 304
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 28135

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.44
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250.6
HP cylinder Inlet steam flow rate [t/h]	: 1073

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 8.23
Average fuel power density [kW/kgU]	: 15.8
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 11.6
Reactor outlet temperature [°C]	: 304
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 28282

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.44
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 253
HP cylinder Inlet steam flow rate [t/h]	: 1073

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 35.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 11800

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.07
Inside shell diameter [m]	: 6.05
Shell thickness [mm]	: 25.4
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 6700
Active core diameter [m]	: 4.5
Active core height/length [m]	: 5
Number of fissile fuel assemblies/bundles	: 3672
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.42
Average core power density [kW/dm ³]	: 10.07
Average fuel power density [kW/kgU]	: 17.7
Fuel linear heat generation rate [kW/m]	: 20.6

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 8.7
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 11800

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: 1330

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.8
Shell thickness [mm]	: 32
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7000
Active core diameter [m]	: 6.38
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 5096
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 13
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 9.1
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20.18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD NO3
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 1.034
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.73
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.8
Shell thickness [mm]	: 32
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7000
Active core diameter [m]	: 6.38
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 5096
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: -
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 9.1
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20.18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD NO3
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 0.991
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 249
Coolant mass flow at the rated power [t/h]	: 13210

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.73
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.972
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 235
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-GRB-SS-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308
Reactor vessel overall length/height [m]	: 16.4
Inside shell diameter [m]	: 3.66
Shell thickness [mm]	: 123.8
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 21000
Active core diameter [m]	: 2.416
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 284
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 39.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 39.44
Average fuel power density [kW/kgU]	: 17.9
Fuel linear heat generation rate [kW/m]	: 14.2

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 69

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.03
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 13246

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: Pools
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.06
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.879
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 904

Main generator

Rated active power [MWe]	: 210
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-GRB-SS-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308
Reactor vessel overall length/height [m]	: 16.4
Inside shell diameter [m]	: 3.66
Shell thickness [mm]	: 123.8
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 21000
Active core diameter [m]	: 2.416
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 284
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 39.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 39.44
Average fuel power density [kW/kgU]	: 17.9
Fuel linear heat generation rate [kW/m]	: 14.2

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 69

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.03
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 13246

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: Pools
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.06
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.88
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 904

Main generator

Rated active power [MWe]	: 210
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.8
Shell thickness [mm]	: 32
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7000
Active core diameter [m]	: 6.38
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 5096
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 9.1
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20.18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD NO3
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 0.7
Reactor outlet temperature [°C]	: 304
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 28282

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.44
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250.6
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: SS-304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.94
Inside shell diameter [m]	: 7.8
Shell thickness [mm]	: 32
Number of pressure channels	: 306
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 7000
Active core diameter [m]	: 6.38
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 5096
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.41
Average core power density [kW/dm ³]	: 9.1
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20.18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD NO3
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 11.6
Reactor outlet temperature [°C]	: 304
Reactor inlet temperature [°C]	: 260
Coolant mass flow at the rated power [t/h]	: 28282

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Mushroom
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.44
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 250.6
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 19.7
Inside shell diameter [m]	: 4.8
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.63
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 400
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 68
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: 20
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 97

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 3410
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 4
HPSI systems pressure [MPa]	: 1.9
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 683

Main generator

Rated active power [MWe]	: 460
Rated apparent power [MVA]	: 525
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	:	<Not Applicable>
Number of motor-driven main feedwater pumps	:	3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	:	<Not Applicable>
Number of feedwater pumps required for full power operation	:	2
Feedwater discharge pressure [MPa]	:	
Steam generator feedwater inlet temperature [°C]	:	

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	:	<Not Applicable>
Number of diesel driven pumps	:	<Not Applicable>
Number of turbine driven pumps	:	<Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	:	Water+Supplementary chemical systems
Fire retardant cable coating used for	:	
Cable segregation within the unit used for	:	Safety Related + Other systems
On-site fire brigade	:	Extra-duty Plant Personnel
Off-site fire brigade response time	:	Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	:	3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	:	2
Number of on-site safety related diesel generators (available per unit)	:	2
Number of on-site safety related gas turbines (available per unit)	:	<Not Applicable>
Number of on site non-safety related diesel generator	:	
Number of on site non-safety related gas turbines	:	
Other on-site emergency AC power sources	:	
Estimated time reserve of the batteries at full load [h]	:	
Total installed capacity of the on-site emergency power sources per unit [MW]	:	
Total battery capacity [Ah]	:	

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	:	900
Interim storage facility type	:	Other - Wet,Dry
Interim storage facility capacity (number of spent fuel assemblies)	:	

Non-electrical applications

Primary heat connection	:	<Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 5.5
Shell thickness [mm]	: 138
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.80
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.03
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 548
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.4
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 4240
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.38
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 2.7
LPSI system pressure [MPa]	: 1.3
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1230

Main generator

Rated active power [MWe]	: 784
Rated apparent power [MVA]	: 911
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1240
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 5.57
Shell thickness [mm]	: 138
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.83
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.03
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 548
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 95
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.4
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 4240
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.38
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 2.7
LPSI system pressure [MPa]	: 1.3
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1230

Main generator

Rated active power [MWe]	: 784
Rated apparent power [MVA]	: 911
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1220
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 5.5
Shell thickness [mm]	: 137
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.80
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.03
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 548
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.4
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 4240
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.38
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 2.7
LPSI system pressure [MPa]	: 1.3
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1230

Main generator

Rated active power [MWe]	: 784
Rated apparent power [MVA]	: 911
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1590
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTA-A-533-B-CL-5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 5.5
Shell thickness [mm]	: 138
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.80
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.03
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 548
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.4
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 4240
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.38
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 2.7
LPSI system pressure [MPa]	: 1.4
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1230

Main generator

Rated active power [MWe]	: 784
Rated apparent power [MVA]	: 911
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1590
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.41
Shell thickness [mm]	: 157
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 132
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 183
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 5700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1770
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.42
Shell thickness [mm]	: 157
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 5700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2662
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 22.9
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 158
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2769
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 157
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.68
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2740
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 22.9
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 158
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.68
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2769
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 55000
Active core diameter [m]	: 2.5
Active core height/length [m]	: 3.7
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 48
Moderator weight [t]	: 175
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 34.3
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 175
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m ²]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m ³]	: 28.3
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 50600
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.41
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 270.1
HP cylinder Inlet steam flow rate [t/h]	: 3133

Main generator

Rated active power [MWe]	: 559
Rated apparent power [MVA]	: 625
Output voltage [kV]	: 19
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.48
Steam generator feedwater inlet temperature [°C]	: 291

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 328
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 12
Extraction steam pressure [MPa]	: 2.57

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 55000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 48
Moderator weight [t]	: 175
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 34.3
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 175
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m2]	: 5060

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 51000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.41
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270.1
HP cylinder Inlet steam flow rate [t/h]	: 3133

Main generator

Rated active power [MWe]	: 559
Rated apparent power [MVA]	: 625
Output voltage [kV]	: 19
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.48
Steam generator feedwater inlet temperature [°C]	: 291

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 400
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 12
Extraction steam pressure [MPa]	: 2.57

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV-2-A (JIS-G3120 + G3204)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 135
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 46
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: 351
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: 351
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: NI/CR/FE ALLOY
SG shell material	: Alloyed Steel SQV2B
Drum separator shell material	:
Design thermal capacity per SG [MW]	: 855.75
Design heat transfer surface [m2]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 73700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.4
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.76
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 273.9
HP cylinder Inlet steam flow rate [t/h]	: 6700

Main generator

Rated active power [MWe]	: 1180
Rated apparent power [MVA]	: 1310
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.17
Steam generator feedwater inlet temperature [°C]	: 298

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1050
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 30
Extraction steam pressure [MPa]	: 2.66

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV-2-A (JIS-G3120 + G3204)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 135
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 46
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: 351
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: 351
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: NI/CR/FE ALLOY
SG shell material	: Alloyed Steel SQV2B
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: 855.75
Design heat transfer surface [m2]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 73700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.4
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.76
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 273.9
HP cylinder Inlet steam flow rate [t/h]	: 6700

Main generator

Rated active power [MWe]	: 1180
Rated apparent power [MVA]	: 1310
Output voltage [kV]	: 24
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.17
Steam generator feedwater inlet temperature [°C]	: 291

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1500
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 30
Extraction steam pressure [MPa]	: 2.66

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV-2-A/SFW-3 (JIS G-3120 SQV2A)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ASME SFA-5.9 ER309 improved type
Reactor vessel overall length/height [m]	: 22.975
Inside shell diameter [m]	: 6.42
Shell thickness [mm]	: 156.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.0
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 29500
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 134
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 24.6
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: <Not Applicable>
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 215.6
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.95
Design pressure difference [MPa]	: 2.36

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8390
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 8.49
LPSI system pressure [MPa]	: 0.90
HPSI system flowrate [t/h]	: 368
LPSI system flowrate [t/h]	: 1691

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282.3
HP cylinder Inlet steam flow rate [t/h]	: 6377.43

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1280
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.1

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.06
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 16.6
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2340
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV-2-A/SFW-3(SQV2A SFVQ1A)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.975
Inside shell diameter [m]	: 6.42
Shell thickness [mm]	: 156.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.44
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 39500
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 134
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 24.6
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: <Not Applicable>
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 215.6
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.95
Design pressure difference [MPa]	: 2.36

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8390
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 8.49
LPSI system pressure [MPa]	: 0.90
HPSI system flowrate [t/h]	: 368
LPSI system flowrate [t/h]	: 1691

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282.3
HP cylinder Inlet steam flow rate [t/h]	: 6072.467

Main generator

Rated active power [MWe]	: 1137
Rated apparent power [MVA]	: 1280
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.1

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.06
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 16.2
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3696
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: (SQV2A,SFVQ1A)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 22.081
Inside shell diameter [m]	: 7.12
Shell thickness [mm]	: 174
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircalloy2
Average fuel enrichment [% of U235]	: 3.7
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 5.16
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 872
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 151
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.6
Average fuel power density [kW/kgU]	: 26
Fuel linear heat generation rate [kW/m]	: 16.5

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: <Not Applicable>
Number of control rod assemblies	: 205

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 52200

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 10
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	: 0.83
Design pressure difference [MPa]	: 0.39

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 7350
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.4
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.73
LPSI system pressure [MPa]	: 1.23
HPSI system flowrate [t/h]	: 182
LPSI system flowrate [t/h]	: 954

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.69
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 283.7
HP cylinder Inlet steam flow rate [t/h]	: 7268.156

Main generator

Rated active power [MWe]	: 1380
Rated apparent power [MVA]	: 1570
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7.326

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.06
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 16.5
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2400
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV2A SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.7
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 132
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.0
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 15.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 6
Design pressure difference [MPa]	: 2.4

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 14000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 8.4
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	: 370
LPSI system flowrate [t/h]	: 1700

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 6400

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1250
Output voltage [kV]	: 19
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.1
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 3

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 16
Total battery capacity [Ah]	: 7400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3300
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508/SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 3
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr-Sn-Fe-Cr-Nb/Zr-Sn-Fe-Cr-Nb-Ni/Zr-Sn-Fe-Nb
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 26
Average discharge burnup [MWd/t]	: 51000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 33.6
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: Gd ₂ O ₃ /BOROSILICATE/B ₄ C
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m ²]	: 5060

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m ³]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 40200
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.267
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.4
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 3201

Main generator

Rated active power [MWe]	: 566.5
Rated apparent power [MVA]	: 630
Output voltage [kV]	: 19
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.7
Steam generator feedwater inlet temperature [°C]	: 221

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 360
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508/SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 3
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr-Sn-Fe-Cr-Nb/Zr-Sn-Fe-Cr-Nb-Ni/Zr-Sn-Fe-Nb
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 26
Average discharge burnup [MWd/t]	: 51000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 33.6
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: Gd ₂ O ₃ /BOROSILICATE/B ₄ C
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30300

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m ²]	: 5060

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m ³]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 40200
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.267
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.4
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 3201

Main generator

Rated active power [MWe]	: 566.5
Rated apparent power [MVA]	: 630
Output voltage [kV]	: 19
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.7
Steam generator feedwater inlet temperature [°C]	: 221

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 444
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 126
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zr-Sn-Fe-Cr-Nb/Zr-Sn-Fe-Cr-Nb-Ni/Zr-Sn-Fe-Nb/Zr-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 31
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 74
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 35.8
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: Gd ₂ O ₃ /BOROSILICATE/B ₄ C
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 45700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 886.67
Design heat transfer surface [m ²]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 67400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.283
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.3
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 280
LPSI system flowrate [t/h]	: 852

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.1
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 5130

Main generator

Rated active power [MWe]	: 890
Rated apparent power [MVA]	: 990
Output voltage [kV]	: 23
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.5
Steam generator feedwater inlet temperature [°C]	: 221

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	: 12.4
Total battery capacity [Ah]	: 8000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1805
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 5700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2790
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.42
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3239
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.42
Shell thickness [mm]	: 157
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.68
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: <Not Applicable>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3212
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.70
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: <Not Applicable>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3209
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JISG-3120/SQV-2-A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS and high Ni alloy steel
Reactor vessel overall length/height [m]	: 22.9
Inside shell diameter [m]	: 6.43
Shell thickness [mm]	: 158
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.68
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 48300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 8700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1780

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3175
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	:
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 7.1
Shell thickness [mm]	: 170
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.75
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 5.16
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 872
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 151
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.6
Average fuel power density [kW/kgU]	: 26
Fuel linear heat generation rate [kW/m]	: 18.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 205

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.31
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 52200

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 10
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.82
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1356
Rated apparent power [MVA]	: <Not Applicable>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3410
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	:
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-CLAD
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 7.1
Shell thickness [mm]	: 170
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.75
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 5.16
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 872
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 151
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.6
Average fuel power density [kW/kgU]	: 26
Fuel linear heat generation rate [kW/m]	: 18.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	:
Number of control rod assemblies	: 205

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.31
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 52200

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 10
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.82
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1356
Rated apparent power [MVA]	: <Not Applicable>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: <Not Applicable>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 6
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3444
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 3.3
Shell thickness [mm]	: 228
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 3.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 31500
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.05
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 40
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 71
Average fuel power density [kW/kgU]	: 25.8
Fuel linear heat generation rate [kW/m]	: 15.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 294
Coolant mass flow at the rated power [t/h]	: 23500

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: alloyed steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 515.2
Design heat transfer surface [m ²]	: 3280

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 3
Design pressure difference [MPa]	: 0.6

Pressurizer

Total volume [m ³]	: 19.8
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 700

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 41000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.1
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 68.1
LPSI system flowrate [t/h]	: 307

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 1
HP cylinder inlet steam pressure [MPa]	: 5.39
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 2029

Main generator

Rated active power [MWe]	: 340
Rated apparent power [MVA]	: 400
Output voltage [kV]	: 17
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Copper

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.82
Steam generator feedwater inlet temperature [°C]	: 220.6

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 3.1
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 288
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 248
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.0
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33300
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 48
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 84
Average fuel power density [kW/kgU]	: 30.3
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 320
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 30000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 728.0
Design heat transfer surface [m2]	: 4300

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.47
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 28
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 41000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 159
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.34
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 269
HP cylinder Inlet steam flow rate [t/h]	: 2856

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: 560
Output voltage [kV]	: 17
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Copper

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.2
Steam generator feedwater inlet temperature [°C]	: 221.1

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 3.3
Total battery capacity [Ah]	: 1600

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 555
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.0
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 20.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 45000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 812.9
Design heat transfer surface [m ²]	: 5055

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 65000
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 4671

Main generator

Rated active power [MWe]	: 826
Rated apparent power [MVA]	: 920
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.0
Steam generator feedwater inlet temperature [°C]	: 221.1

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 3.9
Total battery capacity [Ah]	: 2200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1118
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 273
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 854.8
Design heat transfer surface [m2]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Ice Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 37700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.082
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.1
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: 96.5
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 276
HP cylinder Inlet steam flow rate [t/h]	: 6718

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: 1300
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.0
Steam generator feedwater inlet temperature [°C]	: 222.2

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 5.5
Total battery capacity [Ah]	: 2500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 704
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: 2.7

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 273
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 854.8
Design heat transfer surface [m2]	: 5055

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Ice Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 37700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.082
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.1
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: 96.5
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 276
HP cylinder Inlet steam flow rate [t/h]	: 6718

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: 1300
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.0
Steam generator feedwater inlet temperature [°C]	: 222.2

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 5.5
Total battery capacity [Ah]	: 2500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 704
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: 2.7

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 273
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H ₂ O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 856.0
Design heat transfer surface [m ²]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m ³]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 73700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.4
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.4
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 273.9
HP cylinder Inlet steam flow rate [t/h]	: 6708

Main generator

Rated active power [MWe]	: 1180
Rated apparent power [MVA]	: 1310
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.7
Steam generator feedwater inlet temperature [°C]	: 223.8

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.1
Total battery capacity [Ah]	: 1400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2129
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 273
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 38
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 856.0
Design heat transfer surface [m2]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 73700
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.4
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.4
LPSI system pressure [MPa]	: 1.0
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 273.9
HP cylinder Inlet steam flow rate [t/h]	: 6708

Main generator

Rated active power [MWe]	: 1180
Rated apparent power [MVA]	: 1310
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.7
Steam generator feedwater inlet temperature [°C]	: 223.8

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.1
Total battery capacity [Ah]	: 1400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2129
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASME SA-533 GrB CL1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 4.7
Shell thickness [mm]	: 120
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.9
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.30
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 368
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 63
Moderator weight [t]	: <Not Applicable>
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.3
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 15.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 89

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: <Not Applicable>
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 190
Coolant mass flow at the rated power [t/h]	: 22900

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2.8
Design pressure difference [MPa]	: 1.6

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 7000
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.38
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 7.7
LPSI system pressure [MPa]	: 1.2
HPSI system flowrate [t/h]	: 680
LPSI system flowrate [t/h]	: 1090

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 2910

Main generator

Rated active power [MWe]	: 524
Rated apparent power [MVA]	: 585
Output voltage [kV]	: 22
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.1
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 3
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9
Total battery capacity [Ah]	: 4400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1050
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV2A SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 5.6
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.7
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.07
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 15.9

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 35600

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.7
Design pressure difference [MPa]	: 2.4

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 13000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 8.4
LPSI system pressure [MPa]	: 1
HPSI system flowrate [t/h]	: 320
LPSI system flowrate [t/h]	: 1160

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4600

Main generator

Rated active power [MWe]	: 825
Rated apparent power [MVA]	: 920
Output voltage [kV]	: 17
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.1
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 3

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 15
Total battery capacity [Ah]	: 8400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2240
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV2A SFVQ1A
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS AND HIGH-NI-STEEL
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 5.6
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.7
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.07
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 15.9

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 35600

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.7
Design pressure difference [MPa]	: 2.4

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 13000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.43
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 8.4
LPSI system pressure [MPa]	: 1
HPSI system flowrate [t/h]	: 320
LPSI system flowrate [t/h]	: 1100

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4500

Main generator

Rated active power [MWe]	: 825
Rated apparent power [MVA]	: 920
Output voltage [kV]	: 20
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.1
Steam generator feedwater inlet temperature [°C]	: <Not Applicable>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 3

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 15
Total battery capacity [Ah]	: 8400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 2816
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.1
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 126
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 74
Moderator weight [t]	: 260
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 35.8
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Boron
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 260
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 45700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: Ni-Cr-Fe Alloy
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: 886.67
Design heat transfer surface [m2]	: 5060

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 95600
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.22
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.07
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 5200

Main generator

Rated active power [MWe]	: 890
Rated apparent power [MVA]	: 990
Output voltage [kV]	: 23
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.48
Steam generator feedwater inlet temperature [°C]	: 291

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 11.4
Total battery capacity [Ah]	: 2400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1870
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 25
Extraction steam pressure [MPa]	: 2.66

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.1
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 126
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 74
Moderator weight [t]	: 260
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 35.8
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 260
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 45700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: Ni-Cr-Fe Alloy
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: 886.67
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 109300
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.22
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.07
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 5203

Main generator

Rated active power [MWe]	: 890
Rated apparent power [MVA]	: 990
Output voltage [kV]	: 23
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.48
Steam generator feedwater inlet temperature [°C]	: 291

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 11.4
Total battery capacity [Ah]	: 2400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1360
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 25
Extraction steam pressure [MPa]	: 2.61

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV2A/SFVQ1
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: Stainless steel and high nickel alloyed steel
Reactor vessel overall length/height [m]	: 20.992
Inside shell diameter [m]	: 4.692
Shell thickness [mm]	: 116
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.8
Refuelling frequency [month]	: 15
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.30
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 368
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 64
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.70
Average core power density [kW/dm ³]	: 50.3
Average fuel power density [kW/kgU]	: 25
Fuel linear heat generation rate [kW/m]	: 16

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Liquid zone control
Number of control rod assemblies	: 89

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 275
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 213
Coolant mass flow at the rated power [t/h]	: 22900

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2.84
Design pressure difference [MPa]	: 1.62

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 11000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.427
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.90
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: 810

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 3071

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: 600
Output voltage [kV]	: 20
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	:	
Number of main condensate pumps required for full power	:	4
Condenser vacuum at the full power (absolute pressure) [kPa]	:	5.1

Feedwater system

Number of turbine driven main feedwater pumps	:	<Not Applicable>
Number of motor-driven main feedwater pumps	:	3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	:	<Not Applicable>
Number of feedwater pumps required for full power operation	:	2
Feedwater discharge pressure [MPa]	:	10.1
Steam generator feedwater inlet temperature [°C]	:	212.5

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	:	<Not Applicable>
Number of diesel driven pumps	:	<Not Applicable>
Number of turbine driven pumps	:	1

Fire protection system

On-site fire suppression/extinguishing system	:	Water Sprinkler Only
Fire retardant cable coating used for	:	Safety Related + Other systems
Cable segregation within the unit used for	:	Safety Related + Other systems
On-site fire brigade	:	Dedicated Full Time Fire Brigade
Off-site fire brigade response time	:	Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	:	<Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	:	2
Number of on-site safety related diesel generators (available per unit)	:	3
Number of on-site safety related gas turbines (available per unit)	:	<Not Applicable>
Number of on site non-safety related diesel generator	:	
Number of on site non-safety related gas turbines	:	
Other on-site emergency AC power sources	:	Instrumentation use uninterruptive power supply
Estimated time reserve of the batteries at full load [h]	:	8
Total installed capacity of the on-site emergency power sources per unit [MW]	:	11.2
Total battery capacity [Ah]	:	7050

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	:	1749
Interim storage facility type	:	<Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	:	

Non-electrical applications

Primary heat connection	:	<Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SQV2A/SFVQ1
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: Stainless steel and high nickel alloyed steel
Reactor vessel overall length/height [m]	: 22.081
Inside shell diameter [m]	: 7.12
Shell thickness [mm]	: 174
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.8
Refuelling frequency [month]	: 15
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 5.16
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 872
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 150
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.6
Average fuel power density [kW/kgU]	: 26
Fuel linear heat generation rate [kW/m]	: 17

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Liquid zone control
Number of control rod assemblies	: 205

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H2O
Coolant weight [t]	: 455
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 52200

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 10
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 0.83
Design pressure difference [MPa]	: 0.39

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 17000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.310
Design leakage rate [% per day]	: 0.4
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.73
LPSI system pressure [MPa]	: 1.23
HPSI system flowrate [t/h]	: 182
LPSI system flowrate [t/h]	: 954

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.69
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 7288

Main generator

Rated active power [MWe]	: 1358
Rated apparent power [MVA]	: 1540
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	:	
Number of main condensate pumps required for full power	:	4
Condenser vacuum at the full power (absolute pressure) [kPa]	:	7.7

Feedwater system

Number of turbine driven main feedwater pumps	:	2
Number of motor-driven main feedwater pumps	:	2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	:	<Not Applicable>
Number of feedwater pumps required for full power operation	:	2
Feedwater discharge pressure [MPa]	:	8.06
Steam generator feedwater inlet temperature [°C]	:	215.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	:	<Not Applicable>
Number of diesel driven pumps	:	<Not Applicable>
Number of turbine driven pumps	:	<Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	:	Water Sprinkler Only
Fire retardant cable coating used for	:	Safety Related + Other systems
Cable segregation within the unit used for	:	Safety Related + Other systems
On-site fire brigade	:	Dedicated Full Time Fire Brigade
Off-site fire brigade response time	:	Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	:	1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	:	2
Number of on-site safety related diesel generators (available per unit)	:	3
Number of on-site safety related gas turbines (available per unit)	:	<Not Applicable>
Number of on site non-safety related diesel generator	:	
Number of on site non-safety related gas turbines	:	
Other on-site emergency AC power sources	:	Instrumentation use uninterruptive power supply
Estimated time reserve of the batteries at full load [h]	:	8
Total installed capacity of the on-site emergency power sources per unit [MW]	:	15
Total battery capacity [Ah]	:	8900

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	:	3788
Interim storage facility type	:	<Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	:	-

Non-electrical applications

Primary heat connection	:	<Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: SA-371-ER-308-L
Reactor vessel overall length/height [m]	: 19.5
Inside shell diameter [m]	: 4.8
Shell thickness [mm]	: 117
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.6
Refuelling frequency [month]	: 14
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 400
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 68
Moderator weight [t]	: 150
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 44.0

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: Liquid zone control
Number of control rod assemblies	: 97

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	: 150
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 181
Coolant mass flow at the rated power [t/h]	: 21800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2
Design pressure difference [MPa]	: 0.41

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 2800
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.427
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 7.06
LPSI system pressure [MPa]	: 0.98
HPSI system flowrate [t/h]	: 680
LPSI system flowrate [t/h]	: 850

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 2450

Main generator

Rated active power [MWe]	: 465
Rated apparent power [MVA]	: 520
Output voltage [kV]	: 18
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 9.5
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: No cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.4
Total battery capacity [Ah]	: 4400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1140
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JIS G3120 and JIS G 3204
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: STAINLESS STEEL HIGH NICKLE ALLOY
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 5.6
Shell thickness [mm]	: 137
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3.7
Refuelling frequency [month]	: 14
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.07
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97
Moderator weight [t]	: 200
Number of fuel elements per assembly/bundle	: 74
Fuel clad thickness [mm]	: 0.71
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 44.0

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: Liquid zone control
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	: 200
Operating coolant pressure [MPa]	: 6.93
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 216
Coolant mass flow at the rated power [t/h]	: 35600

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 2.40

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	:

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 7400
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 0.427
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	: 0.961
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	: 1140

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.55
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4600

Main generator

Rated active power [MWe]	: 820
Rated apparent power [MVA]	: 870
Output voltage [kV]	: 15.5
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 2
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.4
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 15.9
Total battery capacity [Ah]	: 6580

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 3518
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.0
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 20.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 45000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 812.9
Design heat transfer surface [m2]	: 5055

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 65000
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 4671

Main generator

Rated active power [MWe]	: 826
Rated apparent power [MVA]	: 920
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 221.1

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 3.9
Total battery capacity [Ah]	: 2200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 424
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.0
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 20.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 45000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 812.9
Design heat transfer surface [m2]	: 4870

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 65000
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 0.24
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.8
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 4671

Main generator

Rated active power [MWe]	: 826
Rated apparent power [MVA]	: 920
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 221.1

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 3.9
Total battery capacity [Ah]	: 2200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 424
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 37
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 45700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 886.2
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 67400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.1
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 266.5
HP cylinder Inlet steam flow rate [t/h]	: 5067

Main generator

Rated active power [MWe]	: 870
Rated apparent power [MVA]	: 970
Output voltage [kV]	: 23
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.2
Steam generator feedwater inlet temperature [°C]	: 221.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 5.4
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1188
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: 2.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 250
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.1
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 37
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 45700

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 886.2
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.48
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 67400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.28
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7.2
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 147
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.21
HP cylinder Inlet steam moisture [%]	: 0.44
HP cylinder inlet steam temperature [°C]	: 266.5
HP cylinder Inlet steam flow rate [t/h]	: 5067

Main generator

Rated active power [MWe]	: 870
Rated apparent power [MVA]	: 970
Output voltage [kV]	: 23
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.2
Steam generator feedwater inlet temperature [°C]	: 221.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 5.4
Total battery capacity [Ah]	: 1200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1188
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: 2.5

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: MN-MO-NI STEEL
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 23
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 157
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 2.2
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 39500
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 130.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 18.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 8100

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 5700
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 3.85
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 1
Number of hydroaccumulators	: 1
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 2.6
LPSI system pressure [MPa]	: 2.0
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 1790

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: 1300
Output voltage [kV]	: 19
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: 215

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: -
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: 2
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: 6000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Available>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JIS G3204, JIS G3120
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SUS304
Reactor vessel overall length/height [m]	: 11.5
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 41000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 48.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.6
Design pressure difference [MPa]	: 0.78

Pressurizer

Total volume [m3]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 42400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.254
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.8
LPSI system pressure [MPa]	: 0.84
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.41
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 3130

Main generator

Rated active power [MWe]	: 579
Rated apparent power [MVA]	: 650
Output voltage [kV]	: 19
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.9
Steam generator feedwater inlet temperature [°C]	: 226

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.74
Total battery capacity [Ah]	: 1400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 690
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JIS G3204, JIS G3120
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SUS304
Reactor vessel overall length/height [m]	: 11.5
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 110
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 41000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.64
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 48.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 20.4

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 30000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 825
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.6
Design pressure difference [MPa]	: 0.78

Pressurizer

Total volume [m3]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 42400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.254
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.8
LPSI system pressure [MPa]	: 0.84
HPSI system flowrate [t/h]	: 160
LPSI system flowrate [t/h]	: 454

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.41
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 3130

Main generator

Rated active power [MWe]	: 579
Rated apparent power [MVA]	: 650
Output voltage [kV]	: 19
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.9
Steam generator feedwater inlet temperature [°C]	: 226

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.74
Total battery capacity [Ah]	: 1400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 690
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: JIS G3204, JIS G3120
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SUS304
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.0
Shell thickness [mm]	: 126
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 74
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 36
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 45400

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 886.67
Design heat transfer surface [m2]	: 5060

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.6
Design pressure difference [MPa]	: 0.78

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 66000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.283
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 9.5
LPSI system pressure [MPa]	: 0.82
HPSI system flowrate [t/h]	: 280
LPSI system flowrate [t/h]	: 681

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.48
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 270.8
HP cylinder Inlet steam flow rate [t/h]	: 5000

Main generator

Rated active power [MWe]	: 912
Rated apparent power [MVA]	: 1020
Output voltage [kV]	: 21
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 5.9
Steam generator feedwater inlet temperature [°C]	: 216

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 5.6
Total battery capacity [Ah]	: 2400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1440
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	:

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B-MOCI, SA-336
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SUS
Reactor vessel overall length/height [m]	: 18.8
Inside shell diameter [m]	: 4.3
Shell thickness [mm]	: 144
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.04
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 19
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.02
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 308
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 52
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 15.18

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.139
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 189
Coolant mass flow at the rated power [t/h]	: 17700

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: Saturated Steam
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 0.8
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 4030
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 4.35
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 5
HPSI systems pressure [MPa]	: 9.1
LPSI system pressure [MPa]	: 1.6
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: 465

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 1
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: 0.28
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 256

Main generator

Rated active power [MWe]	: 357
Rated apparent power [MVA]	: 420
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Brass

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.2
Steam generator feedwater inlet temperature [°C]	: 189

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: -
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: 2
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: 4000

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 135
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 2.6
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 3.07
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: 344
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.7
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.9

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: 344
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 60000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: Alloyed Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: 4780

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.5
Design pressure difference [MPa]	: 1.4

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 73300
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 4
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 5.0
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	: 150
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.87
HP cylinder Inlet steam moisture [%]	: 0.4
HP cylinder inlet steam temperature [°C]	: 273.6
HP cylinder Inlet steam flow rate [t/h]	: 1840

Main generator

Rated active power [MWe]	: 1160
Rated apparent power [MVA]	: 1300
Output voltage [kV]	: 24
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: <Not Applicable>

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 2
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: 221

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: -
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: 2
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: 3200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

KR-1

KORI-1

KOREA, REPUBLIC OF

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 11.89
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 165.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: IMP ZR-4
Average fuel enrichment [% of U235]	: 3.8
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 42326
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 43.61
Moderator weight [t]	: 173
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.617
Average core power density [kW/dm ³]	: 99.1
Average fuel power density [kW/kgU]	: 39.52
Fuel linear heat generation rate [kW/m]	: 21.75

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al2O3/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 173
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 319.9
Reactor inlet temperature [°C]	: 282
Coolant mass flow at the rated power [t/h]	: 30708

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690
SG shell material	: SA508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 864.25
Design heat transfer surface [m2]	: 5119

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5
Design pressure difference [MPa]	: 0.78

Pressurizer

Total volume [m3]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 41059
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.30
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.1
LPSI system pressure [MPa]	: 0.84
HPSI system flowrate [t/h]	: 159
LPSI system flowrate [t/h]	: 454.2

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.17
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 3267

Main generator

Rated active power [MWe]	: 587
Rated apparent power [MVA]	: 749
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.7
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: One Non-Class 1E diesel generator
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 2.92
Total battery capacity [Ah]	: 1700

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 562

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS 304
Reactor vessel overall length/height [m]	: 11.93
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 168.4
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: IMP ZR-4
Average fuel enrichment [% of U235]	: 3.8
Refuelling frequency [month]	: 13
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 36946
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 49.99
Moderator weight [t]	: 170
Number of fuel elements per assembly/bundle	: 235
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 107.9
Average fuel power density [kW/kgU]	: 37.53
Fuel linear heat generation rate [kW/m]	: 18.04

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Borosilicate Glass
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 170
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 324.5
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 32250

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: SA508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 941
Design heat transfer surface [m ²]	: 5114

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 6
Design pressure difference [MPa]	: 0.85

Pressurizer

Total volume [m ³]	: 28
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 40776
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.22
LPSI system pressure [MPa]	: 0.79
HPSI system flowrate [t/h]	: 159
LPSI system flowrate [t/h]	: 454.2

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.35
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 276
HP cylinder Inlet steam flow rate [t/h]	: 3676

Main generator

Rated active power [MWe]	: 650
Rated apparent power [MVA]	: 700
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.4
Steam generator feedwater inlet temperature [°C]	: 222

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: No cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: One Non-Class 1E diesel generator
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 4.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 920

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 4.5
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 41
Average discharge burnup [MWd/t]	: 17910
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 151
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.76
Moderator weight [t]	: 177.56
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.4
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 177.56
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291.5
Coolant mass flow at the rated power [t/h]	: 66611

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 929
Design heat transfer surface [m2]	: 5109.7

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.2
Design pressure difference [MPa]	: 1.166

Pressurizer

Total volume [m3]	: 39.24
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Other - -

Total containment volume [m3]	: 58899
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.3
LPSI system pressure [MPa]	: 0.807
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 681.4

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.53
HP cylinder Inlet steam moisture [%]	: 0.9975
HP cylinder inlet steam temperature [°C]	: 282.3
HP cylinder Inlet steam flow rate [t/h]	: 5565.5

Main generator

Rated active power [MWe]	: 993
Rated apparent power [MVA]	: 1222.22
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9329

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 1.125
Steam generator feedwater inlet temperature [°C]	: 226.6

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: <Not Applicable>
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: AAC D/G
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14
Total battery capacity [Ah]	: <Not Available>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 2260

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: 4.5
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 41
Average discharge burnup [MWd/t]	: 18210
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 151
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 73.09
Moderator weight [t]	: 177.56
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.4
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 177.56
Operating coolant pressure [MPa]	: 15.2
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291.5
Coolant mass flow at the rated power [t/h]	: 66611

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 929
Design heat transfer surface [m ²]	: 5109.7

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.2
Design pressure difference [MPa]	: 1.166

Pressurizer

Total volume [m ³]	: 39.64
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Other - -

Total containment volume [m3]	: 58899
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.31
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.3
LPSI system pressure [MPa]	: 0.807
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 681.4

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.53
HP cylinder Inlet steam moisture [%]	: 0.9975
HP cylinder inlet steam temperature [°C]	: 282.3
HP cylinder Inlet steam flow rate [t/h]	: 5565.5

Main generator

Rated active power [MWe]	: 993
Rated apparent power [MVA]	: 1222.22
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9329

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 1.125
Steam generator feedwater inlet temperature [°C]	: 226.6

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: <Not Applicable>
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: AAC D/G
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14
Total battery capacity [Ah]	: <Not Available>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 2262

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: MNMONI(16-MND-5)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI308_309
Reactor vessel overall length/height [m]	: 13.175
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircallo-4
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 38
Average discharge burnup [MWd/t]	: 42500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.86
Moderator weight [t]	: 270
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 270
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323.2
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 66253

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: low alloy steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 928.3
Design heat transfer surface [m2]	: 4699

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.9
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40.3
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1440

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 49400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.42
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 740

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.53
HP cylinder Inlet steam moisture [%]	: 0.31
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5446

Main generator

Rated active power [MWe]	: 986
Rated apparent power [MVA]	: 1100
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.08

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7
Steam generator feedwater inlet temperature [°C]	: 219.5

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9
Total battery capacity [Ah]	: 5180

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1114

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: MNMONI(16-MND-5)
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI308_310
Reactor vessel overall length/height [m]	: 10.50
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRCALLOY-4
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 38
Average discharge burnup [MWd/t]	: 42500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.86
Moderator weight [t]	: 270
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 270
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 323.2
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 66682

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600TT
SG shell material	: Low Alloy Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 928.3
Design heat transfer surface [m2]	: 4699

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.9
Design pressure difference [MPa]	: 0.8

Pressurizer

Total volume [m3]	: 40.3
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1440

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 49400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.42
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.0
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: 34
LPSI system flowrate [t/h]	: 740

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.53
HP cylinder Inlet steam moisture [%]	: 0.31
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5446

Main generator

Rated active power [MWe]	: 986
Rated apparent power [MVA]	: 1100
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.08

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7
Steam generator feedwater inlet temperature [°C]	: 219.5

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 3
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9
Total battery capacity [Ah]	: 5180

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1062

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508 CL3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ER308L
Reactor vessel overall length/height [m]	: 14.642
Inside shell diameter [m]	: 4.134
Shell thickness [mm]	: 267
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircaloy-4/Zirlo
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36.7
Average discharge burnup [MWd/t]	: 45800
Active core diameter [m]	: 3.122
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 79.296
Moderator weight [t]	: 297.56
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.7
Average fuel power density [kW/kgU]	: 36.89
Fuel linear heat generation rate [kW/m]	: 17.24

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203-UO2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 300.1581
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55110

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: SA508 CL.3
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413.4
Design heat transfer surface [m2]	: 9522.562

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.562
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 25.48
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 77200
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.2
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.1
LPSI system pressure [MPa]	: 0.62
HPSI system flowrate [t/h]	: 185
LPSI system flowrate [t/h]	: 874.4

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.136
HP cylinder Inlet steam moisture [%]	: 0.45
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5506.985

Main generator

Rated active power [MWe]	: 1049
Rated apparent power [MVA]	: 1219.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.0796

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.825
Steam generator feedwater inlet temperature [°C]	: 234

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 10
Total installed capacity of the on-site emergency power sources per unit [MW]	: 21.6
Total battery capacity [Ah]	: 16800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 678

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508 CL.3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ER308L
Reactor vessel overall length/height [m]	: 14.642
Inside shell diameter [m]	: 4.134
Shell thickness [mm]	: 267
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircaloy-4/Zirlo
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36
Average discharge burnup [MWd/t]	: 46603
Active core diameter [m]	: 3.122
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.256
Moderator weight [t]	: 297.56
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.7
Average fuel power density [kW/kgU]	: 36.91
Fuel linear heat generation rate [kW/m]	: 17.24

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203-UO2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 300.1581
Operating coolant pressure [MPa]	: 15.52502
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55110

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: SA508 CL.3
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413.4
Design heat transfer surface [m2]	: 9522.562

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.562
Design pressure difference [MPa]	: 0.7

Pressurizer

Total volume [m3]	: 25.48
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: 77200
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.2
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.1
LPSI system pressure [MPa]	: 0.62
HPSI system flowrate [t/h]	: 185
LPSI system flowrate [t/h]	: 8744

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.136
HP cylinder Inlet steam moisture [%]	: 0.45
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5506.985

Main generator

Rated active power [MWe]	: 1049
Rated apparent power [MVA]	: 1219.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.0796

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.825
Steam generator feedwater inlet temperature [°C]	: 234

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 10
Total installed capacity of the on-site emergency power sources per unit [MW]	: 21.6
Total battery capacity [Ah]	: 16800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 678

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508/AUSTENITE-SS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI308_313
Reactor vessel overall length/height [m]	: 14.445
Inside shell diameter [m]	: 3.96
Shell thickness [mm]	: 259
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 5
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36.15
Average discharge burnup [MWd/t]	: 38723
Active core diameter [m]	: 3.12
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 75.941
Moderator weight [t]	: 328.5
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.69

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 180

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 328.5
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55112.4

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: SA-508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1412.5
Design heat transfer surface [m2]	: <Not Available>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 4.963
Design pressure difference [MPa]	: 0.72

Pressurizer

Total volume [m3]	: 50.97
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 77220
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.05
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.2
LPSI system pressure [MPa]	: 0.62
HPSI system flowrate [t/h]	: 254
LPSI system flowrate [t/h]	: 1135.0

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5780

Main generator

Rated active power [MWe]	: 1050
Rated apparent power [MVA]	: 1209.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.066

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.97
Steam generator feedwater inlet temperature [°C]	: 232

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13.6
Total battery capacity [Ah]	: 2800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 700

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508/AUSTENITE-SS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI308_314
Reactor vessel overall length/height [m]	: 14.445
Inside shell diameter [m]	: 3.962
Shell thickness [mm]	: 259
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 5
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36.15
Average discharge burnup [MWd/t]	: 38829
Active core diameter [m]	: 3.124
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 75.941
Moderator weight [t]	: 328.5
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.69

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 180

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 328.5
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55112.4

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: SA-508
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1412.5
Design heat transfer surface [m2]	: <Not Available>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 4.963
Design pressure difference [MPa]	: 0.72

Pressurizer

Total volume [m3]	: 50.97
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 77220
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.05
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.2
LPSI system pressure [MPa]	: 0.62
HPSI system flowrate [t/h]	: 254
LPSI system flowrate [t/h]	: 1135.0

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5780

Main generator

Rated active power [MWe]	: 1050
Rated apparent power [MVA]	: 1219.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.066

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.97
Steam generator feedwater inlet temperature [°C]	: 232

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13.6
Total battery capacity [Ah]	: 2800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 700

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA240 TP304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: <Not Applicable>
Inside shell diameter [m]	: 7.60
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.19

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: <Not Applicable>
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7500
Active core diameter [m]	: 7.69
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 87
Moderator weight [t]	: 250
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 11.2
Average fuel power density [kW/kgU]	: 23.69
Fuel linear heat generation rate [kW/m]	: 0.1615

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 120.2
Operating coolant pressure [MPa]	: 10.5
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 8020

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: 7
Tube shape	: U-tube
Tube material	: Incoloy800
SG shell material	: SA516-70
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3205

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.7
Design pressure difference [MPa]	: 1.8

Pressurizer

Total volume [m ³]	: 45.3
Number of safety valves	: 2
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Pools

Total containment volume [m ³]	: 48000
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.12
Design leakage rate [% per day]	: 0.5
Type of H ₂ recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.59
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: 2182.0

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.59
HP cylinder Inlet steam moisture [%]	: 0.9968
HP cylinder inlet steam temperature [°C]	: 257.5
HP cylinder Inlet steam flow rate [t/h]	: 3439.8

Main generator

Rated active power [MWe]	: 678.7
Rated apparent power [MVA]	: 800
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 6

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.55
Steam generator feedwater inlet temperature [°C]	: 186.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13.5
Total battery capacity [Ah]	: 1400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 505

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA240 TP304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: <Not Applicable>
Inside shell diameter [m]	: 7.59
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.19

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: <Not Applicable>
Average fuel enrichment [% of U235]	: 0.72
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7500
Active core diameter [m]	: 7.69
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 87
Moderator weight [t]	: 250
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 11.2
Average fuel power density [kW/kgU]	: 23.69
Fuel linear heat generation rate [kW/m]	: 0.1615

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 120.2
Operating coolant pressure [MPa]	: 10.5
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 8020

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: Incoloy 800
SG shell material	: SA516-70
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3197

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.7
Design pressure difference [MPa]	: 1.83

Pressurizer

Total volume [m ³]	: 45.3
Number of safety valves	: 2
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Pools

Total containment volume [m ³]	: 48000
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.12
Design leakage rate [% per day]	: 0.5
Type of H ₂ recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.68
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: 2182

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.59
HP cylinder Inlet steam moisture [%]	: 0.9968
HP cylinder inlet steam temperature [°C]	: 257.5
HP cylinder Inlet steam flow rate [t/h]	: 3584.8

Main generator

Rated active power [MWe]	: 713
Rated apparent power [MVA]	: 828
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 6

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.5
Steam generator feedwater inlet temperature [°C]	: 188.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 723.54

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SS304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: <Not Applicable>
Inside shell diameter [m]	: 7.60
Shell thickness [mm]	: 43.4
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.19

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: <Not Applicable>
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: 15
Part of the core refuelled [%]	: 96
Average discharge burnup [MWd/t]	: 7296
Active core diameter [m]	: 7.69
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 84
Moderator weight [t]	: 236
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: 11.2
Average fuel power density [kW/kgU]	: 23.69
Fuel linear heat generation rate [kW/m]	: 0.1615

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 180
Operating coolant pressure [MPa]	: 10.5
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 8020

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Available>
Tube shape	: U-tube
Tube material	: Incoloy 800
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3197

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.7
Design pressure difference [MPa]	: 1.83

Pressurizer

Total volume [m ³]	: 45
Number of safety valves	: <Not Applicable>
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m ³]	: 48480
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.12
Design leakage rate [% per day]	: 0.5
Type of H ₂ recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: 2181.6

Reactor protection system

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.59
HP cylinder Inlet steam moisture [%]	: 0.9968
HP cylinder inlet steam temperature [°C]	: 257.5
HP cylinder Inlet steam flow rate [t/h]	: 3584.8

Main generator

Rated active power [MWe]	: 713
Rated apparent power [MVA]	: 828
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 6

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.5
Steam generator feedwater inlet temperature [°C]	: 188.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14.2
Total battery capacity [Ah]	: 8875

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1862

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SS304L
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: <Not Applicable>
Reactor vessel overall length/height [m]	: <Not Applicable>
Inside shell diameter [m]	: 7.60
Shell thickness [mm]	: 43.4
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.19

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: <Not Applicable>
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: 15
Part of the core refuelled [%]	: 96
Average discharge burnup [MWd/t]	: 7296
Active core diameter [m]	: 7.69
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 84
Moderator weight [t]	: 236
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: 11.2
Average fuel power density [kW/kgU]	: 23.69
Fuel linear heat generation rate [kW/m]	: 0.1615

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: 180
Operating coolant pressure [MPa]	: 10.5
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266
Coolant mass flow at the rated power [t/h]	: 8020

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: Incoloy 800
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3197

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.7
Design pressure difference [MPa]	: 1.83

Pressurizer

Total volume [m ³]	: 45
Number of safety valves	: <Not Applicable>
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m ³]	: 48480
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.12
Design leakage rate [% per day]	: 0.5
Type of H ₂ recombiner	: <Not Applicable>

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 0.7
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: 2181.6

Reactor protection system

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Applicable>
Number of independent system divisions	: <Not Applicable>

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.59
HP cylinder Inlet steam moisture [%]	: 0.9968
HP cylinder inlet steam temperature [°C]	: 257.5
HP cylinder Inlet steam flow rate [t/h]	: 3584.8

Main generator

Rated active power [MWe]	: 713
Rated apparent power [MVA]	: 828
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 6

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.5
Steam generator feedwater inlet temperature [°C]	: 188.7

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 14.2
Total battery capacity [Ah]	: 8875

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1862

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: <Not Available>
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 41
Average discharge burnup [MWd/t]	: 18190
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.85
Moderator weight [t]	: <Not Available>
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 41.8
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 246.3566
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 80409

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: SA533
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 929
Design heat transfer surface [m2]	: 5114

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.3
Design pressure difference [MPa]	: 0.9

Pressurizer

Total volume [m3]	: 39.64
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 58899
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.41
Design leakage rate [% per day]	: 0.06
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.8
LPSI system pressure [MPa]	: 0.807
HPSI system flowrate [t/h]	: 34.0687
LPSI system flowrate [t/h]	: 681.4

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.54
HP cylinder Inlet steam moisture [%]	: 0.43
HP cylinder inlet steam temperature [°C]	: 281.2
HP cylinder Inlet steam flow rate [t/h]	: 5565

Main generator

Rated active power [MWe]	: 997
Rated apparent power [MVA]	: 1284
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9329

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 8.56
Steam generator feedwater inlet temperature [°C]	: 231

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2.2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.4
Total battery capacity [Ah]	: 6480

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 2262

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS_304
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: <Not Available>
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 41
Average discharge burnup [MWd/t]	: 17960
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.658
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.76
Moderator weight [t]	: <Not Available>
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 41.8
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Applicable>
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: 246.3566
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 80409

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: SA533
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 929
Design heat transfer surface [m ²]	: 5114

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.3
Design pressure difference [MPa]	: 0.9

Pressurizer

Total volume [m ³]	: 39.64
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 58899
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.41
Design leakage rate [% per day]	: 0.06
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.3
LPSI system pressure [MPa]	: 0.807
HPSI system flowrate [t/h]	: 34.0687
LPSI system flowrate [t/h]	: 681.4

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.54
HP cylinder Inlet steam moisture [%]	: 0.43
HP cylinder inlet steam temperature [°C]	: 281.4
HP cylinder Inlet steam flow rate [t/h]	: 5565

Main generator

Rated active power [MWe]	: 997
Rated apparent power [MVA]	: 1284
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9329

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 3
Feedwater discharge pressure [MPa]	: 8.56
Steam generator feedwater inlet temperature [°C]	: 231

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2.2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.4
Total battery capacity [Ah]	: 6480

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1152

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL4
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-309
Reactor vessel overall length/height [m]	: 14.4
Inside shell diameter [m]	: 4.18
Shell thickness [mm]	: 204.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 4.2
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36
Average discharge burnup [MWd/t]	: 42700
Active core diameter [m]	: 3.124
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.25
Moderator weight [t]	: 273.3
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 96.6
Average fuel power density [kW/kgU]	: 36.9
Fuel linear heat generation rate [kW/m]	: 17.26

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: B4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 282
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 60732

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Carbon Steel/Stainless Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413.4
Design heat transfer surface [m2]	: 7016

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6
Design pressure difference [MPa]	: 0.35

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 76400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.37
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.0
LPSI system pressure [MPa]	: 0.5
HPSI system flowrate [t/h]	: 144
LPSI system flowrate [t/h]	: 954

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.50
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5539

Main generator

Rated active power [MWe]	: 1049
Rated apparent power [MVA]	: 1213
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 10.2
Steam generator feedwater inlet temperature [°C]	: 234

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: 2
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Applicable>
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: AAC D/G
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13
Total battery capacity [Ah]	: 11200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1302

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL5
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-309
Reactor vessel overall length/height [m]	: 14.64
Inside shell diameter [m]	: 4.18
Shell thickness [mm]	: 204.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 4.2
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36
Average discharge burnup [MWd/t]	: 42700
Active core diameter [m]	: 3.124
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.25
Moderator weight [t]	: 273.3
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 96.6
Average fuel power density [kW/kgU]	: 36.9
Fuel linear heat generation rate [kW/m]	: 17.26

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: B4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 282
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 60732

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: Carbon Steel/Stainless Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413.4
Design heat transfer surface [m2]	: 7016

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6
Design pressure difference [MPa]	: 0.35

Pressurizer

Total volume [m3]	: 51
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 76400
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.37
Design leakage rate [% per day]	: 0.1
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 14.0
LPSI system pressure [MPa]	: 0.5
HPSI system flowrate [t/h]	: 144
LPSI system flowrate [t/h]	: 954

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5539

Main generator

Rated active power [MWe]	: 1049
Rated apparent power [MVA]	: 1213
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 10.2
Steam generator feedwater inlet temperature [°C]	: 234

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: 2
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Applicable>
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: AAC D/G
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 13
Total battery capacity [Ah]	: 11200

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 1302

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL6
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ER309L
Reactor vessel overall length/height [m]	: 14.45
Inside shell diameter [m]	: 4.18
Shell thickness [mm]	: 204.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircalloy-4/Zirlo
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36
Average discharge burnup [MWd/t]	: 13820
Active core diameter [m]	: 3.124
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.29
Moderator weight [t]	: 310.9
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.26
Average fuel power density [kW/kgU]	: 41.8
Fuel linear heat generation rate [kW/m]	: 19.68

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203-UO2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 328.5
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55110

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413
Design heat transfer surface [m2]	: 9522

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.6
Design pressure difference [MPa]	: 1

Pressurizer

Total volume [m3]	: 51.4
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 77220.5
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.075
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.5
LPSI system pressure [MPa]	: 1
HPSI system flowrate [t/h]	: 185
LPSI system flowrate [t/h]	: 871.2

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 4
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.45
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5507

Main generator

Rated active power [MWe]	: 1050
Rated apparent power [MVA]	: 1219.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.08

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 9.3
Steam generator feedwater inlet temperature [°C]	: 233

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 10
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 19400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 700

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508CL6
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ER309L
Reactor vessel overall length/height [m]	: 14.45
Inside shell diameter [m]	: 4.18
Shell thickness [mm]	: 204.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zircalloy-4/Zirlo
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 36
Average discharge burnup [MWd/t]	: 13450
Active core diameter [m]	: 3.124
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76.32
Moderator weight [t]	: 310.9
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 96.26
Average fuel power density [kW/kgU]	: 41.8
Fuel linear heat generation rate [kW/m]	: 19.68

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203-UO2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 328.5
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 327.3
Reactor inlet temperature [°C]	: 295.8
Coolant mass flow at the rated power [t/h]	: 55110

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1413
Design heat transfer surface [m2]	: 9522

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 6.6
Design pressure difference [MPa]	: 1

Pressurizer

Total volume [m3]	: 51.4
Number of safety valves	: 3
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: 1800

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 77220.5
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.39
Design leakage rate [% per day]	: 0.075
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 8.5
LPSI system pressure [MPa]	: 1
HPSI system flowrate [t/h]	: 185
LPSI system flowrate [t/h]	: 871.2

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 4
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: 0.45
HP cylinder inlet steam temperature [°C]	: 287.1
HP cylinder Inlet steam flow rate [t/h]	: 5507

Main generator

Rated active power [MWe]	: 1050
Rated apparent power [MVA]	: 1219.6
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 5.08

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: 1
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 9.3
Steam generator feedwater inlet temperature [°C]	: 233

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 1
Estimated time reserve of the batteries at full load [h]	: 10
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7.2
Total battery capacity [Ah]	: 19400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Applicable>
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 700

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

MX-1

LAGUNA VERDE-1

MEXICO

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.23
Shell thickness [mm]	: 168
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.62
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 444
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 81.02
Moderator weight [t]	: <Not Available>
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 49.15
Average fuel power density [kW/kgU]	: 24.3
Fuel linear heat generation rate [kW/m]	: 17.72

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 109

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.2
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 278.5
Coolant mass flow at the rated power [t/h]	: 4876

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 3.35
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Pools

Total containment volume [m3]	: 7447
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: <Not Applicable>
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: <Not Applicable>
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 2
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 1
HP cylinder inlet steam pressure [MPa]	: 6.84
HP cylinder Inlet steam moisture [%]	: <Not Available>
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 3774

Main generator

Rated active power [MWe]	: 675
Rated apparent power [MVA]	: 750
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 6.6

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.35
Steam generator feedwater inlet temperature [°C]	: 188

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Greater than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9.4
Total battery capacity [Ah]	: 7900

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-GR-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.23
Shell thickness [mm]	: 168
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.62
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 444
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 81.28
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 49.15
Average fuel power density [kW/kgU]	: 34.3
Fuel linear heat generation rate [kW/m]	: 17.72

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: <Not Available>
Number of control rod assemblies	: 109

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 7.2
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 278.5
Coolant mass flow at the rated power [t/h]	: 4876

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2.35
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Pools

Total containment volume [m3]	: 7447
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: <Not Applicable>
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: <Not Applicable>
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: 2
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 1
HP cylinder inlet steam pressure [MPa]	: 6.84
HP cylinder Inlet steam moisture [%]	: <Not Available>
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 3774

Main generator

Rated active power [MWe]	: 675
Rated apparent power [MVA]	: 750
Output voltage [kV]	: 22
Output frequency [Hz]	: 60

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.35
Steam generator feedwater inlet temperature [°C]	: 188

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Greater than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 5
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 0
Estimated time reserve of the batteries at full load [h]	: 8
Total installed capacity of the on-site emergency power sources per unit [MW]	: 9.4
Total battery capacity [Ah]	: 7900

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

NL-2 **BORSSELE** **NETHERLANDS**

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 7.5
Inside shell diameter [m]	: 3.81
Shell thickness [mm]	: 185
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4,PCA 2-6
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 11
Part of the core refuelled [%]	: 23
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 2.676
Active core height/length [m]	: 2.65
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38.7
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 205
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 90.2
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 20.26

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 313
Reactor inlet temperature [°C]	: 295.4
Coolant mass flow at the rated power [t/h]	: 36000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY-800
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Available>
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 4.9
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 5.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 741

Main generator

Rated active power [MWe]	: 596
Rated apparent power [MVA]	: 600
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: -
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: 1
Number of on site non-safety related gas turbines	: 1
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 24
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 130
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-111
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 10.7
Inside shell diameter [m]	: 3.374
Shell thickness [mm]	: 175
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRCALLOY-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 2.486
Active core height/length [m]	: 2.9
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 35.917
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 70.9
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 13.59

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORATE GLASS
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 420

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 315.5
Reactor inlet temperature [°C]	: 288.5
Coolant mass flow at the rated power [t/h]	: 24000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.65
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.34
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 268.3
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 325
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: AS304L,A240
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 4.88
Inside shell diameter [m]	: 4.88
Shell thickness [mm]	: 192.5
Number of pressure channels	: 380
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 8650
Active core diameter [m]	: 3.82
Active core height/length [m]	: 4.87
Number of fissile fuel assemblies/bundles	: 2277
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 30.4
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 19
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 8.72
Average fuel power density [kW/kgU]	: 15.5
Fuel linear heat generation rate [kW/m]	: 4.13

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 4

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 10.6
Reactor outlet temperature [°C]	: 293
Reactor inlet temperature [°C]	: 246
Coolant mass flow at the rated power [t/h]	: 6872

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: MONEL-400
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2520

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.87
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 248
HP cylinder Inlet steam flow rate [t/h]	: 747

Main generator

Rated active power [MWe]	: 138.6
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ZR-NB
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.97
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.34

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zy-4
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7100
Active core diameter [m]	: 6.123
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97.67
Moderator weight [t]	: 242.54
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 11.7
Average fuel power density [kW/kgU]	: 21.1
Fuel linear heat generation rate [kW/m]	: 42.9

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd(NO ₃) ₃ ·6H ₂ O
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 65

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D ₂ O
Coolant weight [t]	: 88.266
Operating coolant pressure [MPa]	: 9.99
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266.6
Coolant mass flow at the rated power [t/h]	: 27720

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: SB163NiFeCr UNSNo. 8800
SG shell material	: Carbon Steel SA 516gr.70
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3193

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 5.028
Design pressure difference [MPa]	: 1.87

Pressurizer

Total volume [m ³]	: 45.31
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.1241
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: <Not Applicable>
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: <Not Applicable>
LPSI system pressure [MPa]	: 1.5
HPSI system flowrate [t/h]	: <Not Applicable>
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.551
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 258
HP cylinder Inlet steam flow rate [t/h]	: 3481.3

Main generator

Rated active power [MWe]	: 719.93
Rated apparent power [MVA]	: 800
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.23

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.8
Steam generator feedwater inlet temperature [°C]	: 187.2

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 4
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 3 chanel,230V,50 Hz, 80 kVA each
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 17
Total battery capacity [Ah]	: 7400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 50000
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 168000

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 2
Total capacity of heat connections [MWt]	: 46.5
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Flat End
Reactor vessel centreline orientation	: Horizontal
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ZR-NB
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 5.97
Inside shell diameter [m]	: 7.6
Shell thickness [mm]	: 28.6
Number of pressure channels	: 380
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: 4.34

Reactor Core

Fuel assembly geometry	: Circular
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: D ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zy-4
Average fuel enrichment [% of U235]	: 0.71
Refuelling frequency [month]	: <Not Applicable>
Part of the core refuelled [%]	: <Not Applicable>
Average discharge burnup [MWd/t]	: 7100
Active core diameter [m]	: 6.123
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 4560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 97.67
Moderator weight [t]	: 242.54
Number of fuel elements per assembly/bundle	: 37
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 11.7
Average fuel power density [kW/kgU]	: 21.1
Fuel linear heat generation rate [kW/m]	: 42.9

Reactivity control

Control rod material	: Cadmium SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd(NO ₃) ₃ x6H ₂ O
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: Gd Injection
Number of control rod assemblies	: 65

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: D ₂ O
Coolant weight [t]	: 82.266
Operating coolant pressure [MPa]	: 9.99
Reactor outlet temperature [°C]	: 310
Reactor inlet temperature [°C]	: 266.6
Coolant mass flow at the rated power [t/h]	: 27720

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: SB163NiFeCrUNSN _o .8800
SG shell material	: Carbon Steel SA516gr.70
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 516
Design heat transfer surface [m ²]	: 3193

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: 5.028
Design pressure difference [MPa]	: 1.87

Pressurizer

Total volume [m ³]	: 45.31
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 48477
Number of containment spray pumps	: <Not Applicable>
Containment design pressure [MPa]	: 0.1241
Design leakage rate [% per day]	: 0.5
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 4.42
LPSI system pressure [MPa]	: 1.5
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 4.551
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 258
HP cylinder Inlet steam flow rate [t/h]	: 3481.3

Main generator

Rated active power [MWe]	: 719.93
Rated apparent power [MVA]	: 800
Output voltage [kV]	: 24
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Stainles Steel

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.23

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.8
Steam generator feedwater inlet temperature [°C]	: 187.2

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: 3 Channels,230V,50Hz,80kVa each
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 17
Total battery capacity [Ah]	: 7400

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 50000
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 168000

Non-electrical applications

Primary heat connection	: Main Steam
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 2
Total capacity of heat connections [MWt]	: 46.5
Extraction steam pressure [MPa]	: <Not Applicable>

RU-96

BALAKOVO-1

RUSSIAN FEDERATION

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: <Not Available>
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CH18N10
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 12.6
Inside shell diameter [m]	: 12.86
Shell thickness [mm]	: 30
Number of pressure channels	:
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	:

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: <Not Available>
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB, SS
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 5
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 100000
Active core diameter [m]	: 2.05
Active core height/length [m]	: 1.03
Number of fissile fuel assemblies/bundles	: 369
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	:
Fuel weight [t]	: 12.1
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 127
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: 413
Average fuel power density [kW/kgU]	: 136
Fuel linear heat generation rate [kW/m]	: 38

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	:
Number of control rod assemblies	: 19

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: Na
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 8.8
Reactor outlet temperature [°C]	: 550
Reactor inlet temperature [°C]	: 377
Coolant mass flow at the rated power [t/h]	: 25000

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: ICR2MO
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	:
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 13
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 500
HP cylinder Inlet steam flow rate [t/h]	: 540

Main generator

Rated active power [MWe]	: 200
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CR18NI10TI
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 3
Inside shell diameter [m]	: 4.1
Shell thickness [mm]	: -
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 3000
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3
Number of fissile fuel assemblies/bundles	: 273
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 7.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 6
Fuel clad thickness [mm]	: -
Average core power density [kW/dm ³]	: 1.8
Average fuel power density [kW/kgU]	: 18
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 6
Reactor outlet temperature [°C]	: 280
Reactor inlet temperature [°C]	: 253
Coolant mass flow at the rated power [t/h]	: 630

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 6
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 100

Main generator

Rated active power [MWe]	: 12
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CR18NI10TI
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 3
Inside shell diameter [m]	: 4.1
Shell thickness [mm]	: -
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 3000
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3
Number of fissile fuel assemblies/bundles	: 273
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 7.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 6
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 1.8
Average fuel power density [kW/kgU]	: 18
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 6
Reactor outlet temperature [°C]	: 280
Reactor inlet temperature [°C]	: 253
Coolant mass flow at the rated power [t/h]	: 630

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 6
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 100

Main generator

Rated active power [MWe]	: 12
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CR18NI10TI
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 3
Inside shell diameter [m]	: 4.1
Shell thickness [mm]	: -
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 3000
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3
Number of fissile fuel assemblies/bundles	: 273
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 7.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 6
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 1.8
Average fuel power density [kW/kgU]	: 18
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 6
Reactor outlet temperature [°C]	: 280
Reactor inlet temperature [°C]	: 253
Coolant mass flow at the rated power [t/h]	: 630

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 6
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 100

Main generator

Rated active power [MWe]	: 12
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CR18NI10TI
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 3
Inside shell diameter [m]	: 4.1
Shell thickness [mm]	: -
Number of pressure channels	: -
Pressure channel material	: -
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 3000
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3
Number of fissile fuel assemblies/bundles	: 273
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 7.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 6
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 1.8
Average fuel power density [kW/kgU]	: 18
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: <Not Available>
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 6
Reactor outlet temperature [°C]	: 280
Reactor inlet temperature [°C]	: 253
Coolant mass flow at the rated power [t/h]	: 630

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 6
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: <Not Available>
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 100

Main generator

Rated active power [MWe]	: 12
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 23Ni,13Cr - 1 layer, 19Ni,9Cr - 3 other layers
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 300
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 250
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.08
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 10000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1693
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 11.2

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 138

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.08
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 10000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1693
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 11.2

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 150

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.08
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 10000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 16

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 170

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.08
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 10000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 16

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 167

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 211

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 211

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Applicable>
Containment Shape	: <Not Available>
Containment structure	: <Not Applicable>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 211

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR+1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22000
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 211

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: -
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 295.8
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 40
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 295.8
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Steel+Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 6
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 331
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 109

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 324
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: -

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: <Not Available>
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.5
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	:
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 84800

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: -
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 0.7
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 84800

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: <Not Available>
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22200
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 175

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22200
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 175

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 7
Inside shell diameter [m]	: 0.04
Shell thickness [mm]	: 4
Number of pressure channels	: -
Pressure channel material	: Zr+Nb(2.5%)
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 22200
Active core diameter [m]	: 11.8
Active core height/length [m]	: 7
Number of fissile fuel assemblies/bundles	: 1661
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 18
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 103
Average fuel power density [kW/kgU]	: 19.4
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 175

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 270
Coolant mass flow at the rated power [t/h]	: 37500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: 4
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: -
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.4
HP cylinder Inlet steam flow rate [t/h]	: 2890

Main generator

Rated active power [MWe]	: 500
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

SK-13

BOHUNICE-3

SLOVAK REPUBLIC

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: E-110 (Zr+1%Nb)
Average fuel enrichment [% of U235]	: 4.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 23
Average discharge burnup [MWd/t]	: 46000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.685
Average core power density [kW/dm ³]	: 87.9
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.0
Reactor outlet temperature [°C]	: 295
Reactor inlet temperature [°C]	: 268
Coolant mass flow at the rated power [t/h]	: 42000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m2]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: Rectangular
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 50000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 0.25
Design leakage rate [% per day]	:
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: 3
HPSI systems pressure [MPa]	: 13
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.512
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1360

Main generator

Rated active power [MWe]	: 253
Rated apparent power [MVA]	: 259
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 12

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 4800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 379
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 7056

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: 147
Extraction steam pressure [MPa]	: 1.451

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: E-110 (Zr+1%Nb)
Average fuel enrichment [% of U235]	: 4.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 23
Average discharge burnup [MWd/t]	: 46000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.685
Average core power density [kW/dm ³]	: 88.7
Average fuel power density [kW/kgU]	: 34.4
Fuel linear heat generation rate [kW/m]	: 13.3

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.0
Reactor outlet temperature [°C]	: 295
Reactor inlet temperature [°C]	: 268
Coolant mass flow at the rated power [t/h]	: 42000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 2
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: Rectangular
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 50000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 0.25
Design leakage rate [% per day]	: 13
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: 3
HPSI systems pressure [MPa]	: 13
LPSI system pressure [MPa]	: 0.9
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.512
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1360

Main generator

Rated active power [MWe]	: 253
Rated apparent power [MVA]	: 273
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 12

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 4800

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 379
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 7056

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	:
Extraction steam pressure [MPa]	: 1.451

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: E-110 (Zr+1%Nb)
Average fuel enrichment [% of U235]	: 4.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 22
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 44
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.4
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.49

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.0
Reactor outlet temperature [°C]	: 295
Reactor inlet temperature [°C]	: 268
Coolant mass flow at the rated power [t/h]	: 42000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.45

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: Rectangular
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 52519
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 0.25
Design leakage rate [% per day]	: 5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: 3
HPSI systems pressure [MPa]	: 13.5
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 800

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.32
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1270

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 259
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 4500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 657
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: E-110 (Zr+1%Nb)
Average fuel enrichment [% of U235]	: 4.25
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 22
Average discharge burnup [MWd/t]	: 44000
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 44
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 84.4
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.49

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: 3,35%Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 12.0
Reactor outlet temperature [°C]	: 295
Reactor inlet temperature [°C]	: 268
Coolant mass flow at the rated power [t/h]	: 42000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: Saturated Steam
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 229.2
Design heat transfer surface [m ²]	: 2620

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 1.6
Design pressure difference [MPa]	: 0.45

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: Rectangular
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 52519
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 0.25
Design leakage rate [% per day]	: 5
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 3
Number of hydroaccumulators	: 4
Number of core spray system pumps (BWR)	: 3
HPSI systems pressure [MPa]	: 13.5
LPSI system pressure [MPa]	: 0.8
HPSI system flowrate [t/h]	: 65
LPSI system flowrate [t/h]	: 800

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 3

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 4.32
HP cylinder Inlet steam moisture [%]	: 0.25
HP cylinder inlet steam temperature [°C]	: 256
HP cylinder Inlet steam flow rate [t/h]	: 1270

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: 259
Output voltage [kV]	: 15.75
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 2
Condenser tube material	: Brass

Number of main condensate pumps	: 6
Number of main condensate pumps required for full power	: 4
Condenser vacuum at the full power (absolute pressure) [kPa]	: 8

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 5
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 4
Feedwater discharge pressure [MPa]	: 6.6
Steam generator feedwater inlet temperature [°C]	: 223

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 8.4
Total battery capacity [Ah]	: 4500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 657
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: SA 533 GR.B, CLASS 1.
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 11.9
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 168
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: 4.8
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 46
Average discharge burnup [MWd/t]	: 44029
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 50
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 235
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 108.7
Average fuel power density [kW/kgU]	: 37.56
Fuel linear heat generation rate [kW/m]	: 17.62

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: 1.1X IFBA, 1.4X IFBA
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325.2
Reactor inlet temperature [°C]	: 286.7
Coolant mass flow at the rated power [t/h]	: 28774

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 690TT
SG shell material	: Carbon Steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	: 7177

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 5.2
Design pressure difference [MPa]	: 1.6

Pressurizer

Total volume [m ³]	: 28.3
Number of safety valves	: 2
Number of relief valves	: 2
Installed heater power [kW]	: 1000

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	: 40000
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.309
Design leakage rate [% per day]	: 0.2
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 17.1
LPSI system pressure [MPa]	: 4.1
HPSI system flowrate [t/h]	: 100
LPSI system flowrate [t/h]	: 460

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.13
HP cylinder Inlet steam moisture [%]	: 0.47
HP cylinder inlet steam temperature [°C]	: 278.1
HP cylinder Inlet steam flow rate [t/h]	: 3931

Main generator

Rated active power [MWe]	: 730
Rated apparent power [MVA]	: 813
Output voltage [kV]	: 21
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: -

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.9

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 6.67
Steam generator feedwater inlet temperature [°C]	: 222.5

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 4
Total installed capacity of the on-site emergency power sources per unit [MW]	: 7
Total battery capacity [Ah]	: 2080

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1694
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

ZA-1

KOEBERG-1

SOUTH AFRICA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508 CLASS3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI-309/308
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 3.98
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.4
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.8
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 323.2
Reactor inlet temperature [°C]	: 286.7
Coolant mass flow at the rated power [t/h]	: 47675

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.5
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5439.6

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: 1120
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508 CLASS 3
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AISI-309/308
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 3.98
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.4
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.8
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 323.2
Reactor inlet temperature [°C]	: 286.7
Coolant mass flow at the rated power [t/h]	: 47675

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.5
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 5439.6

Main generator

Rated active power [MWe]	: <Not Available>
Rated apparent power [MVA]	: 1120
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: AS-304SS
Reactor vessel overall length/height [m]	: 13.2
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zirlo
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 58000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102
Average fuel power density [kW/kgU]	: 37.07
Fuel linear heat generation rate [kW/m]	: 17.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GADOLINIA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 291.7
Coolant mass flow at the rated power [t/h]	: 21500

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY 800-M
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 39.64
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: -

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: -

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.9
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 5365

Main generator

Rated active power [MWe]	: 981
Rated apparent power [MVA]	: 1034
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1804
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: AS-304SS
Reactor vessel overall length/height [m]	: 13.2
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: Zirlo
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 101.4
Average fuel power density [kW/kgU]	: 37.07
Fuel linear heat generation rate [kW/m]	: 17.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GADOLINIA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 49

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 291.7
Coolant mass flow at the rated power [t/h]	: 21500

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCOLOY 800-M
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 39.64
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Spray

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: -

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: -

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.9
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 5365

Main generator

Rated active power [MWe]	: 980
Rated apparent power [MVA]	: 1034
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 1

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: <Not Applicable>
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1804
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 4.002
Shell thickness [mm]	: 198.3
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 28
Average discharge burnup [MWd/t]	: 50500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.47
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 110.74
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 18.92

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.72
Reactor outlet temperature [°C]	: 326.7
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 15890

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.8
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 40
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Other - relief valves

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 3.86
Design leakage rate [% per day]	: 0.05
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 1528

Main generator

Rated active power [MWe]	: 930
Rated apparent power [MVA]	: 930
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1421
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	:
Reactor vessel overall length/height [m]	: 12.98
Inside shell diameter [m]	: 4.007
Shell thickness [mm]	: 198
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	:
Average discharge burnup [MWd/t]	: 50500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.47
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 110.74
Average fuel power density [kW/kgU]	:
Fuel linear heat generation rate [kW/m]	: 18.92

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al2O3/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.72
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 15890

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.8
Design pressure difference [MPa]	:

Pressurizer

Total volume [m ³]	: 39.6
Number of safety valves	: 3
Number of relief valves	: 2
Installed heater power [kW]	: 1400

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Other - relief valves

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 3.86
Design leakage rate [% per day]	: 0.05
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: 2
Number of hydroaccumulators	: 3
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 1528

Main generator

Rated active power [MWe]	: 930
Rated apparent power [MVA]	: 930
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 4
Number of main condensate pumps required for full power	: 3
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 2
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 1
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: 2

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1421
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	:

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ST SA-533 Gr B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 2.39
Inside shell diameter [m]	: 5.53
Shell thickness [mm]	: 136
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 4
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 41
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 4.29
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 624
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 111.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 92
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 52.53
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 20.03

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.26
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 38300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 4.77
Design pressure difference [MPa]	: 1.824

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 28838
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 0.103
Design leakage rate [% per day]	: 0.3
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 3
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 1
HPSI systems pressure [MPa]	: 7.91
LPSI system pressure [MPa]	: 3.43
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.115
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284.6
HP cylinder Inlet steam flow rate [t/h]	: 1494.4

Main generator

Rated active power [MWe]	: 1080
Rated apparent power [MVA]	: 1082.5
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: 1
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: Low Mn-Mo steel (ASME SA-302,GrB).
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-305
Reactor vessel overall length/height [m]	: 19.96
Inside shell diameter [m]	: 5.36
Shell thickness [mm]	: 123.8
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 31000
Active core diameter [m]	: 3.44
Active core height/length [m]	: 3.69
Number of fissile fuel assemblies/bundles	: 400
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 70.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 15.16

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 97

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.03
Reactor outlet temperature [°C]	: 283
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 21770

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Superheated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 689

Main generator

Rated active power [MWe]	: 460
Rated apparent power [MVA]	: 575
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Applicable>
Interim storage facility capacity (number of spent fuel assemblies)	: <Not Applicable>

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: S-20MN- MO-NI 55
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS 1.4550
Reactor vessel overall length/height [m]	: 10.689
Inside shell diameter [m]	: 4.878
Shell thickness [mm]	: 245
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	:
Active core height/length [m]	:
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.8
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.725
Average core power density [kW/dm ³]	:
Average fuel power density [kW/kgU]	: 36.34
Fuel linear heat generation rate [kW/m]	: 20.71

Reactivity control

Control rod material	: Carbon Steel
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	:
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	:

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325.9
Reactor inlet temperature [°C]	: 294.3
Coolant mass flow at the rated power [t/h]	: 59806.8

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	:
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 1009.3
Design heat transfer surface [m ²]	:

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	: 0.66

Pressurizer

Total volume [m ³]	: 45.2
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1638

Containment systems

Containment type	: Double
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Applicable>
Additional pressure suppression system	: <Not Applicable>

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	:
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: 6
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	:
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 278.12
HP cylinder Inlet steam flow rate [t/h]	: 5604

Main generator

Rated active power [MWe]	: 1066
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: 4
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 3
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: AS
Reactor vessel overall length/height [m]	: 12.34
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	:
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 50500
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	:
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 110.74
Average fuel power density [kW/kgU]	: 38
Fuel linear heat generation rate [kW/m]	: 18.92

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	:
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	:
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 328.3
Reactor inlet temperature [°C]	: 291.6
Coolant mass flow at the rated power [t/h]	: 16477.7

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	:
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	:
Design heat transfer surface [m2]	: 4929.3

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	:
Design pressure difference [MPa]	:

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	:

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Spray
Additional pressure suppression system	: Vacuum Building

Total containment volume [m3]	:
Number of containment spray pumps	:
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	:
Type of H2 recombiner	:

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	:
LPSI system pressure [MPa]	:
HPSI system flowrate [t/h]	:
LPSI system flowrate [t/h]	:

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 332
HP cylinder Inlet steam flow rate [t/h]	: 5545

Main generator

Rated active power [MWe]	: 992
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

SE-9

FORSMARK-1

SWEDEN

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SIS 2333
Reactor vessel overall length/height [m]	: 21.7
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 4.51
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 676
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 117.5
Moderator weight [t]	: 247
Number of fuel elements per assembly/bundle	: 96
Fuel clad thickness [mm]	: 0.605
Average core power density [kW/dm ³]	: 45.9
Average fuel power density [kW/kgU]	: 23.1
Fuel linear heat generation rate [kW/m]	: 13.4

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: UO ₂ -Gd ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: H ₃ BO ₃ Injection
Number of control rod assemblies	: 161

Reactor coolant system

Number of external reactor coolant loops	: <Not Applicable>
Coolant type	: H ₂ O
Coolant weight [t]	: 247
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 273.5
Coolant mass flow at the rated power [t/h]	: 35100

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	: 0.83
Design pressure difference [MPa]	: 0.125

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 9850
Number of containment spray pumps	: 1
Containment design pressure [MPa]	: 6
Design leakage rate [% per day]	: 1
Type of H2 recombiner	: Active

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 7
LPSI system pressure [MPa]	: 1.2
HPSI system flowrate [t/h]	: 81
LPSI system flowrate [t/h]	: 450

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: 0.5
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 4360

Main generator

Rated active power [MWe]	: 466
Rated apparent power [MVA]	: 635
Output voltage [kV]	: 21.5
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 1
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3.9

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 8.42
Steam generator feedwater inlet temperature [°C]	: <Not Applicable>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Applicable>
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: No cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: 1
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 6.4
Total battery capacity [Ah]	: <Not Applicable>

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SIS 2333
Reactor vessel overall length/height [m]	: 20.8
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 4.51
Active core height/length [m]	: 3.75
Number of fissile fuel assemblies/bundles	: 676
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 122.3
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 100
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 45.9
Average fuel power density [kW/kgU]	: 22.4
Fuel linear heat generation rate [kW/m]	: 16.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 161

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 273.5
Coolant mass flow at the rated power [t/h]	: 4700

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 6
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 4360

Main generator

Rated active power [MWe]	: 466
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA508B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SIS 2333
Reactor vessel overall length/height [m]	: 9.8
Inside shell diameter [m]	: 3.94
Shell thickness [mm]	: 181
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2,FE-ZR LINER
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 4.6
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 700
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 126
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 91
Fuel clad thickness [mm]	: 0.605
Average core power density [kW/dm ³]	: 48.6
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 169

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 273.5
Coolant mass flow at the rated power [t/h]	: 5130

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Available>
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 6
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.45
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 5846

Main generator

Rated active power [MWe]	: 1200
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 17.6
Inside shell diameter [m]	: 5
Shell thickness [mm]	: 125
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 2.5
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.67
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 448
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 90
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 96
Fuel clad thickness [mm]	: 0.60
Average core power density [kW/dm ³]	: 36
Average fuel power density [kW/kgU]	: 17.4
Fuel linear heat generation rate [kW/m]	: 9.70

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 112

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 16600

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 0.98
Design pressure difference [MPa]	: 0.045

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m ³]	: 5500
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 5.0
Design leakage rate [% per day]	: 1.0
Type of H ₂ recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 1
Number of LPSI systems	: 1
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: 7.5
LPSI system pressure [MPa]	: 0.2
HPSI system flowrate [t/h]	: 108
LPSI system flowrate [t/h]	: 1300

Reactor protection system

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital/Analog
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 5
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: 0.20
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 2300

Main generator

Rated active power [MWe]	: 487
Rated apparent power [MVA]	: 572
Output voltage [kV]	: 21.4
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 4
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 3

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.3
Steam generator feedwater inlet temperature [°C]	: <Not Applicable>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related cables
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 2
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: 2
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 35
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 969
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 3659

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308
Reactor vessel overall length/height [m]	: 20
Inside shell diameter [m]	: 5.5
Shell thickness [mm]	: 150
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.63
Active core height/length [m]	: 3.72
Number of fissile fuel assemblies/bundles	: 444
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 96
Fuel clad thickness [mm]	: 0.605
Average core power density [kW/dm ³]	: 47
Average fuel power density [kW/kgU]	: 22.1
Fuel linear heat generation rate [kW/m]	: 12.3

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Applicable>
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 109

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 27700

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: -
Number of containment spray pumps	: 2
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: 1.0
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 2
Number of LPSI systems	: 2
Number of hydroaccumulators	: <Not Applicable>
Number of core spray system pumps (BWR)	: 2
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 2

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: 0.02
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 3310

Main generator

Rated active power [MWe]	: 630
Rated apparent power [MVA]	: 707
Output voltage [kV]	: 21
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 2
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: 1
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 2
Number of on-site safety related gas turbines (available per unit)	: 2
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 35
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 700
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 3659

Non-electrical applications

Primary heat connection	: <Not Applicable>
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Number of heat connection points per unit	: <Not Applicable>
Number of intermediate circuits/heat exchangers	: <Not Applicable>
Total capacity of heat connections [MWt]	: <Not Applicable>
Extraction steam pressure [MPa]	: <Not Applicable>

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-305
Reactor vessel overall length/height [m]	: 20.8
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Rods
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: 3
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 32000
Active core diameter [m]	: 4.6
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 700
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 126
Moderator weight [t]	: 250
Number of fuel elements per assembly/bundle	: 96
Fuel clad thickness [mm]	: 0.60
Average core power density [kW/dm ³]	: 54
Average fuel power density [kW/kgU]	: 24.1
Fuel linear heat generation rate [kW/m]	: 14.0

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 169

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: 250
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 41000

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Applicable>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: <Not Applicable>
Pump motor rating [MW]	: 0.63
Design pressure difference [MPa]	: 0.37

Pressurizer

Total volume [m3]	: <Not Applicable>
Number of safety valves	: <Not Applicable>
Number of relief valves	: <Not Applicable>
Installed heater power [kW]	: <Not Applicable>

Containment systems

Containment type	: Confinement
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: Pools
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 8500
Number of containment spray pumps	: 4
Containment design pressure [MPa]	: 6
Design leakage rate [% per day]	: 1.0
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 4
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: 4
HPSI systems pressure [MPa]	: 10
LPSI system pressure [MPa]	: 1.5
HPSI system flowrate [t/h]	: 324
LPSI system flowrate [t/h]	: 5100

Reactor protection system

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Analogue
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 3
HP cylinder inlet steam pressure [MPa]	: 6.7
HP cylinder Inlet steam moisture [%]	: 0.18
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 5832

Main generator

Rated active power [MWe]	: 1205
Rated apparent power [MVA]	: 1295
Output voltage [kV]	: 20.5
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: 3
Condenser tube material	: Titanium

Number of main condensate pumps	: 3
Number of main condensate pumps required for full power	: 2
Condenser vacuum at the full power (absolute pressure) [kPa]	: 7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 1
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.95
Steam generator feedwater inlet temperature [°C]	: <Not Applicable>

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water+Supplementary chemical systems
Fire retardant cable coating used for	: Safety Related cables
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Dedicated Full Time Fire Brigade
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 4
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: <Not Applicable>
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: 10.8
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 1040
Interim storage facility type	: Wet
Interim storage facility capacity (number of spent fuel assemblies)	: 3659

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 20
Inside shell diameter [m]	: 6
Shell thickness [mm]	: 150
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 15
Average discharge burnup [MWd/t]	: 41000
Active core diameter [m]	: 4.39
Active core height/length [m]	: 3.68
Number of fissile fuel assemblies/bundles	: 648
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 112
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 83
Fuel clad thickness [mm]	: 0.605
Average core power density [kW/dm ³]	: 48
Average fuel power density [kW/kgU]	: 21.9
Fuel linear heat generation rate [kW/m]	: 28

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Boron/Hafmium
Burnable neutron absorber material specification	: B-4C, HF
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 157

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 272
Coolant mass flow at the rated power [t/h]	: 41580

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.66
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: 4072

Main generator

Rated active power [MWe]	: 450
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.3
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: MS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 24
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 3
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 99.9
Average fuel power density [kW/kgU]	: 34
Fuel linear heat generation rate [kW/m]	: 22.02

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.4
Reactor outlet temperature [°C]	: 322.4
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 50600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.25
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: 4640

Main generator

Rated active power [MWe]	: 458
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-305
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/DUPLEX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 46000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.61
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.5
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.51
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 46440

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.65
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272.8
HP cylinder Inlet steam flow rate [t/h]	: 5400

Main generator

Rated active power [MWe]	: 490
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-2
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-306
Reactor vessel overall length/height [m]	: 12
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/DUPLEX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 46000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.61
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.5
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.51
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 46550

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.65
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272.8
HP cylinder Inlet steam flow rate [t/h]	: 5400

Main generator

Rated active power [MWe]	: 490
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS SA320B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 10.7
Inside shell diameter [m]	: 3.3
Shell thickness [mm]	: 166
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂ /MOX
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/DUPLEX
Average fuel enrichment [% of U235]	: 4.68
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 17
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 2.45
Active core height/length [m]	: 3.05
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38
Moderator weight [t]	: 103
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 78
Average fuel power density [kW/kgU]	: 28
Fuel linear heat generation rate [kW/m]	: 16.7

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 17

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 103
Operating coolant pressure [MPa]	: 15.3
Reactor outlet temperature [°C]	: 313
Reactor inlet temperature [°C]	: 281
Coolant mass flow at the rated power [t/h]	: 22870

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: SA508MCL3
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 565
Design heat transfer surface [m2]	: 3345

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 3
Design pressure difference [MPa]	: 0.4

Pressurizer

Total volume [m3]	: 20
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 645

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m ³]	: 35000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 3.1
Design leakage rate [% per day]	: 0.25
Type of H ₂ recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: <Not Applicable>
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: 3
HPSI systems pressure [MPa]	: 10.7
LPSI system pressure [MPa]	: <Not Applicable>
HPSI system flowrate [t/h]	: 203.4
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.3
HP cylinder Inlet steam moisture [%]	: 0.01
HP cylinder inlet steam temperature [°C]	: 268
HP cylinder Inlet steam flow rate [t/h]	: 995

Main generator

Rated active power [MWe]	: 190
Rated apparent power [MVA]	: 220
Output voltage [kV]	: 15
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 2
Number of feedwater pumps required for full power operation	: 1
Feedwater discharge pressure [MPa]	: 6.76
Steam generator feedwater inlet temperature [°C]	: 212

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 4
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: Hydro power station
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 12
Total battery capacity [Ah]	: 6850

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 560
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 2000

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 2
Number of intermediate circuits/heat exchangers	: 2
Total capacity of heat connections [MWt]	: 60
Extraction steam pressure [MPa]	: 0.25

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS SA320B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 10.7
Inside shell diameter [m]	: 3.3
Shell thickness [mm]	: 166
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4/DUPLEX
Average fuel enrichment [% of U235]	: 4.68
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 17
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 2.45
Active core height/length [m]	: 3.05
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 38
Moderator weight [t]	: 103
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 78
Average fuel power density [kW/kgU]	: 29
Fuel linear heat generation rate [kW/m]	: 16.7

Reactivity control

Control rod material	: Ag-In-Cd alloy
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: <Not Applicable>
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: H3BO3 Injection
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: 103
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 313
Reactor inlet temperature [°C]	: 281
Coolant mass flow at the rated power [t/h]	: 22870

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: Saturated Steam
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: SA508MCL3
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: 565
Design heat transfer surface [m2]	: 3345

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: 3
Design pressure difference [MPa]	: 0.4

Pressurizer

Total volume [m3]	: 20
Number of safety valves	: 3
Number of relief valves	: 3
Installed heater power [kW]	: 645

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: Spray

Total containment volume [m3]	: 35000
Number of containment spray pumps	: 3
Containment design pressure [MPa]	: 3.1
Design leakage rate [% per day]	: 0.25
Type of H2 recombiner	: Passive

Emergency core cooling systems

Number of HPSI systems	: 3
Number of LPSI systems	: <Not Applicable>
Number of hydroaccumulators	: 2
Number of core spray system pumps (BWR)	: <Not Applicable>
HPSI systems pressure [MPa]	: 10.7
LPSI system pressure [MPa]	: <Not Applicable>
HPSI system flowrate [t/h]	: 203.4
LPSI system flowrate [t/h]	: <Not Applicable>

Reactor protection system

Control equipment technology	: Digital
Number of independent system divisions	: 4

Engineered Safeguard Feature Actuation System

Control equipment technology	: Digital
Number of independent system divisions	: 4

Secondary systems

Turbine

Turbine type	: Saturated steam
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: 1
Number of IP cylinders per turbine	: <Not Applicable>
Number of LP cylinders per turbine	: 2
HP cylinder inlet steam pressure [MPa]	: 5.3
HP cylinder Inlet steam moisture [%]	: 0.01
HP cylinder inlet steam temperature [°C]	: 268
HP cylinder Inlet steam flow rate [t/h]	: 1145

Main generator

Rated active power [MWe]	: 190
Rated apparent power [MVA]	: 220
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: 2
Condenser tube material	: Titanium

Number of main condensate pumps	: 2
Number of main condensate pumps required for full power	: 1
Condenser vacuum at the full power (absolute pressure) [kPa]	: 4.7

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Applicable>
Number of motor-driven main feedwater pumps	: 3
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: 2
Number of feedwater pumps required for full power operation	: 1
Feedwater discharge pressure [MPa]	: 6.76
Steam generator feedwater inlet temperature [°C]	: 212

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 3
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: Water Sprinkler Only
Fire retardant cable coating used for	: Safety Related + Other systems
Cable segregation within the unit used for	: Safety Related + Other systems
On-site fire brigade	: Extra-duty Plant Personnel
Off-site fire brigade response time	: Less than 30 min.

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 2
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: <Not Applicable>
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	: Hydro power station
Estimated time reserve of the batteries at full load [h]	: 2
Total installed capacity of the on-site emergency power sources per unit [MW]	: 12
Total battery capacity [Ah]	: 6850

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 560
Interim storage facility type	: Dry
Interim storage facility capacity (number of spent fuel assemblies)	: 2000

Non-electrical applications

Primary heat connection	: Turbine Extraction
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Number of heat connection points per unit	: 1
Number of intermediate circuits/heat exchangers	: 1
Total capacity of heat connections [MWt]	: 40
Extraction steam pressure [MPa]	: 0.25

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 22-NiMoCr-37
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: X-10-CR-NI-TI-18.9
Reactor vessel overall length/height [m]	: 11
Inside shell diameter [m]	: 4.79
Shell thickness [mm]	: 215
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 52000
Active core diameter [m]	: 3.24
Active core height/length [m]	: 3.58
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 75.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 205
Fuel clad thickness [mm]	: 0.726
Average core power density [kW/dm ³]	: 100.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 22.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.3
Reactor outlet temperature [°C]	: 324.5
Reactor inlet temperature [°C]	: 291.5
Coolant mass flow at the rated power [t/h]	: 52986

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 42
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: 4
Number of LPSI systems	: 6
Number of hydroaccumulators	: 6
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: 1650

Main generator

Rated active power [MWe]	: 1020
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: 50

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: 3
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: 236
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508-CL-2
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 21.742
Inside shell diameter [m]	: 6.045
Shell thickness [mm]	: 149
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 18
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 4.38
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 648
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 118.3
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 96
Fuel clad thickness [mm]	: 0.63
Average core power density [kW/dm ³]	: 62.7
Average fuel power density [kW/kgU]	: 26.4
Fuel linear heat generation rate [kW/m]	: 13.3

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 211

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.31
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 40144

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.76
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284.8
HP cylinder Inlet steam flow rate [t/h]	: 6120

Main generator

Rated active power [MWe]	: 1285
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 19
Inside shell diameter [m]	: 4.03
Shell thickness [mm]	: 100
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 16.7
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 2.64
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 240
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 51.7
Average fuel power density [kW/kgU]	: 22.4
Fuel linear heat generation rate [kW/m]	: 14.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 57

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.23
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 190
Coolant mass flow at the rated power [t/h]	: 15000

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 1828

Main generator

Rated active power [MWe]	: 188
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

TW-1

CHIN SHAN-1

TAIWAN, CHINA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-302-B
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.156
Shell thickness [mm]	: 133
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 408
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 71.903
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 160
Fuel clad thickness [mm]	: 0.889
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 18.41

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 97

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.19
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 215.5
Coolant mass flow at the rated power [t/h]	: 24040

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.94
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 636
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/SA-302-B
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.156
Shell thickness [mm]	: 133
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.47
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 408
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 71.946
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 160
Fuel clad thickness [mm]	: 0.889
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 18.41

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 97

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.19
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 215.5
Coolant mass flow at the rated power [t/h]	: 24040

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.94
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 636
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 21.3
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 136
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 29
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: 4.18
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 624
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 110.15
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 91
Fuel clad thickness [mm]	: 0.606
Average core power density [kW/dm ³]	: 52.4
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.32
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 38322

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.06
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.64
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.8
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 985.6
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 21.3
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 136
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 29
Average discharge burnup [MWd/t]	: -
Active core diameter [m]	: 4.18
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 624
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 108.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 91
Fuel clad thickness [mm]	: 0.606
Average core power density [kW/dm ³]	: 52.4
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.32
Reactor outlet temperature [°C]	: 284
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 38322

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.06
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.64
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280.8
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 985.6
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.98
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 66.64
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.75

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: IFBA/ZYBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 328.7
Reactor inlet temperature [°C]	: 291.7
Coolant mass flow at the rated power [t/h]	: 49600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1620

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.56
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 951
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST
Vessel cladding material	: <Not Available>
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.98
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 66.64
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 105.5
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.75

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 291.7
Coolant mass flow at the rated power [t/h]	: 49600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: -
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1620

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 3
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.56
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 951
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

GB-18A

DUNGENESS-B1

UNITED KINGDOM

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 17.7
Inside shell diameter [m]	: 20
Shell thickness [mm]	: 3800
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 14
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 19000
Active core diameter [m]	: 9.4
Active core height/length [m]	: 7.3
Number of fissile fuel assemblies/bundles	: 2856
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 122
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: 127
Average fuel power density [kW/kgU]	: 11.3
Fuel linear heat generation rate [kW/m]	: 14.4

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 3.43
Reactor outlet temperature [°C]	: 673
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 13500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 555
HP cylinder Inlet steam flow rate [t/h]	: 1690

Main generator

Rated active power [MWe]	: 660
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 17.7
Inside shell diameter [m]	: 20
Shell thickness [mm]	: 3800
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 14
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 18000
Active core diameter [m]	: 9.4
Active core height/length [m]	: 7.3
Number of fissile fuel assemblies/bundles	: 2856
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 122
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.4
Average core power density [kW/dm ³]	: 12.7
Average fuel power density [kW/kgU]	: 11.3
Fuel linear heat generation rate [kW/m]	: 14.4

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 36

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 3.43
Reactor outlet temperature [°C]	: 673
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 13500

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 555
HP cylinder Inlet steam flow rate [t/h]	: 1690

Main generator

Rated active power [MWe]	: 670
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 13
Shell thickness [mm]	: 6400
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 4
Part of the core refuelled [%]	: 7.5
Average discharge burnup [MWd/t]	: 24000
Active core diameter [m]	: 9.37
Active core height/length [m]	: 8.3
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 110
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.37
Average core power density [kW/dm ³]	: 2.69
Average fuel power density [kW/kgU]	: 13.6
Fuel linear heat generation rate [kW/m]	: 16.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: NONE
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.22
Reactor outlet temperature [°C]	: 675
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.53
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1730

Main generator

Rated active power [MWe]	: 666
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 13
Shell thickness [mm]	: 6400
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 4
Part of the core refuelled [%]	: 7.5
Average discharge burnup [MWd/t]	: 24000
Active core diameter [m]	: 9.37
Active core height/length [m]	: 8.3
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 110
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.37
Average core power density [kW/dm ³]	: 2.69
Average fuel power density [kW/kgU]	: 13.6
Fuel linear heat generation rate [kW/m]	: 16.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Applicable>
Burnable neutron absorber material specification	: NONE
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.22
Reactor outlet temperature [°C]	: 675
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.53
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1730

Main generator

Rated active power [MWe]	: 666
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 13.1
Shell thickness [mm]	: 6400
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 4
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 24000
Active core diameter [m]	: 9.3
Active core height/length [m]	: 8.3
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 110
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.461
Average core power density [kW/dm ³]	: 2.64
Average fuel power density [kW/kgU]	: 13.6
Fuel linear heat generation rate [kW/m]	: 16.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.22
Reactor outlet temperature [°C]	: 651
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1730

Main generator

Rated active power [MWe]	: 666
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 13
Shell thickness [mm]	: 6400
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 4
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 24000
Active core diameter [m]	: 9.3
Active core height/length [m]	: 8.3
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 110
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.461
Average core power density [kW/dm ³]	: 2.64
Average fuel power density [kW/kgU]	: 13.7
Fuel linear heat generation rate [kW/m]	: 15.6

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.22
Reactor outlet temperature [°C]	: 651
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1800

Main generator

Rated active power [MWe]	: 666
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 20.3
Shell thickness [mm]	: 5762
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 3
Part of the core refuelled [%]	: 5
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 9.46
Active core height/length [m]	: 8.31
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 113
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 13.6
Fuel linear heat generation rate [kW/m]	: 16.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.32
Reactor outlet temperature [°C]	: 635
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 14700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Helical
Tube material	: CHR/SS
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 15.9
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1730

Main generator

Rated active power [MWe]	: 672
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 20.3
Shell thickness [mm]	: 5762
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 3
Part of the core refuelled [%]	: 5
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 9.46
Active core height/length [m]	: 8.31
Number of fissile fuel assemblies/bundles	: 2592
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 113
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 13.7
Fuel linear heat generation rate [kW/m]	: 15.6

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 8
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.32
Reactor outlet temperature [°C]	: 635
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 14700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: CHR/SS
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1800

Main generator

Rated active power [MWe]	: 672
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 35.65
Inside shell diameter [m]	: 18.9
Shell thickness [mm]	: 5030
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: 2
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 9.11
Active core height/length [m]	: 8.31
Number of fissile fuel assemblies/bundles	: 2464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 105.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.381
Average core power density [kW/dm ³]	: 2.96
Average fuel power density [kW/kgU]	: 10.74
Fuel linear heat generation rate [kW/m]	: 14.32

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.24
Reactor outlet temperature [°C]	: 655
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 495
HP cylinder Inlet steam flow rate [t/h]	: 1435

Main generator

Rated active power [MWe]	: 660
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 35.65
Inside shell diameter [m]	: 18.9
Shell thickness [mm]	: 5030
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: 2
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 9.11
Active core height/length [m]	: 8.31
Number of fissile fuel assemblies/bundles	: 2464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 105.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.381
Average core power density [kW/dm ³]	: 2.96
Average fuel power density [kW/kgU]	: 10.74
Fuel linear heat generation rate [kW/m]	: 14.32

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.24
Reactor outlet temperature [°C]	: 655
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 13700

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 8
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: MILD/CHROME/S/ST
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 8
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 495
HP cylinder Inlet steam flow rate [t/h]	: 1435

Main generator

Rated active power [MWe]	: 660
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 19.35
Inside shell diameter [m]	: 18.9
Shell thickness [mm]	: 5000
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 21000
Active core diameter [m]	: 9.11
Active core height/length [m]	: 8.29
Number of fissile fuel assemblies/bundles	: 2464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 105
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 14.3
Fuel linear heat generation rate [kW/m]	: 16.9

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.04
Reactor outlet temperature [°C]	: 639
Reactor inlet temperature [°C]	: 282
Coolant mass flow at the rated power [t/h]	: 13000

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1786

Main generator

Rated active power [MWe]	: 660
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 19.35
Inside shell diameter [m]	: 18.9
Shell thickness [mm]	: 5000
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 21000
Active core diameter [m]	: 9.11
Active core height/length [m]	: 8.29
Number of fissile fuel assemblies/bundles	: 2464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 105
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.38
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 14.3
Fuel linear heat generation rate [kW/m]	: 16.9

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.04
Reactor outlet temperature [°C]	: 639
Reactor inlet temperature [°C]	: 282
Coolant mass flow at the rated power [t/h]	: 13000

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1786

Main generator

Rated active power [MWe]	: 660
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 23.5
Shell thickness [mm]	: 4600
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: U
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Magnesium Alloy
Fuel clad material specification	: MAGNOX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 5430
Active core diameter [m]	: 12.8
Active core height/length [m]	: 8.5
Number of fissile fuel assemblies/bundles	: 26464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 293.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 8
Fuel clad thickness [mm]	: 2.4
Average core power density [kW/dm ³]	: 0.74
Average fuel power density [kW/kgU]	: 2.34
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 65

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 2.66
Reactor outlet temperature [°C]	: 365
Reactor inlet temperature [°C]	: 220
Coolant mass flow at the rated power [t/h]	: 17855

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.96
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 2.7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 350
HP cylinder Inlet steam flow rate [t/h]	: 1071

Main generator

Rated active power [MWe]	: 313
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 18.3
Inside shell diameter [m]	: 23.5
Shell thickness [mm]	: 4600
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: U
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Magnesium Alloy
Fuel clad material specification	: MAGNOX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 5470
Active core diameter [m]	: 12.8
Active core height/length [m]	: 8.5
Number of fissile fuel assemblies/bundles	: 26464
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 293.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 1
Fuel clad thickness [mm]	: 2.4
Average core power density [kW/dm ³]	: 0.74
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 27

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 65

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 2.66
Reactor outlet temperature [°C]	: 365
Reactor inlet temperature [°C]	: 220
Coolant mass flow at the rated power [t/h]	: 17855

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.96
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 2.7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 350
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 313
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508/SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.59
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 220
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 88.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 33.8
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 323.4
Reactor inlet temperature [°C]	: 292.4
Coolant mass flow at the rated power [t/h]	: 69000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.71
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.6
HP cylinder Inlet steam flow rate [t/h]	: 6868

Main generator

Rated active power [MWe]	: 628.8
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 20.28
Shell thickness [mm]	: 5762
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 29500
Active core diameter [m]	: 9.31
Active core height/length [m]	: 8.29
Number of fissile fuel assemblies/bundles	: 2656
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 114
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.37
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 14.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.23
Reactor outlet temperature [°C]	: 635
Reactor inlet temperature [°C]	: 298
Coolant mass flow at the rated power [t/h]	: 15120

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1890

Main generator

Rated active power [MWe]	: 682
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: 21.9
Inside shell diameter [m]	: 20.28
Shell thickness [mm]	: 5762
Number of pressure channels	: -
Pressure channel material	: Carbon Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Stainless Steel
Fuel clad material specification	: SS
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 29500
Active core diameter [m]	: 9.31
Active core height/length [m]	: 8.29
Number of fissile fuel assemblies/bundles	: 2656
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 114
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 36
Fuel clad thickness [mm]	: 0.37
Average core power density [kW/dm ³]	: 2.76
Average fuel power density [kW/kgU]	: 14.3
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 44

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 4.23
Reactor outlet temperature [°C]	: 635
Reactor inlet temperature [°C]	: 298
Coolant mass flow at the rated power [t/h]	: 15120

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 8
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 16.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 538
HP cylinder Inlet steam flow rate [t/h]	: 1890

Main generator

Rated active power [MWe]	: 682
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: -
Inside shell diameter [m]	: 29.3
Shell thickness [mm]	: 3360
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: U
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Magnesium Alloy
Fuel clad material specification	: MAGNOX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 54000
Active core diameter [m]	: 17.4
Active core height/length [m]	: 9.1
Number of fissile fuel assemblies/bundles	: 49248
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 592.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 1
Fuel clad thickness [mm]	: 3.4
Average core power density [kW/dm ³]	: 0.9
Average fuel power density [kW/kgU]	: 2.78
Fuel linear heat generation rate [kW/m]	: 28.6

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 153

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 2.76
Reactor outlet temperature [°C]	: 370
Reactor inlet temperature [°C]	: 230
Coolant mass flow at the rated power [t/h]	: 40000

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: Vacuum Building
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.76
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.54
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 320
HP cylinder Inlet steam flow rate [t/h]	: 1180

Main generator

Rated active power [MWe]	: 335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: <Not Available>
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Concrete
Reactor vessel material specification	: PC
Vessel cladding material	: <Not Applicable>
Vessel cladding material specification	: NONE
Reactor vessel overall length/height [m]	: -
Inside shell diameter [m]	: 29.3
Shell thickness [mm]	: 3360
Number of pressure channels	: -
Pressure channel material	: Manganese Steel
Pressure channel wall thickness [mm]	: -

Reactor Core

Fuel assembly geometry	: <Not Available>
Fuel Form	: <Not Available>
Fuel material	: U
Refuelling type	: ON-line
Moderator material	: GRAPHITE
Fuel clad material	: Magnesium Alloy
Fuel clad material specification	: MAGNOX
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 54000
Active core diameter [m]	: 17.4
Active core height/length [m]	: 9.1
Number of fissile fuel assemblies/bundles	: 49248
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 592.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 1
Fuel clad thickness [mm]	: 3.4
Average core power density [kW/dm ³]	: 0.85
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron SS
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: <Not Available>
Secondary shutdown system	: -
Number of control rod assemblies	: 153

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: CO2
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 2.76
Reactor outlet temperature [°C]	: 370
Reactor inlet temperature [°C]	: 234
Coolant mass flow at the rated power [t/h]	: 40000

Steam generators (SG)/drum separators

Type of SG	: <Not Available>
SG output	: <Not Available>
Number of SG	: <Not Available>
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: -
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 4
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.76
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 3.54
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 320
HP cylinder Inlet steam flow rate [t/h]	: -

Main generator

Rated active power [MWe]	: 335
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

UA-40

KHMELNITSKI-1

UKRAINE

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6290

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 312
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 295.8
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1375

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 3.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 28600
Active core diameter [m]	: 2.88
Active core height/length [m]	: 2.5
Number of fissile fuel assemblies/bundles	: 349
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 126
Fuel clad thickness [mm]	: 0.65
Average core power density [kW/dm ³]	: 83
Average fuel power density [kW/kgU]	: 32.7
Fuel linear heat generation rate [kW/m]	: 13.1

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 6
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 12.5
Reactor outlet temperature [°C]	: 295.8
Reactor inlet temperature [°C]	: 267
Coolant mass flow at the rated power [t/h]	: 39000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 6
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 22K carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 6
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 44
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: Water Condenser

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.4
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 255
HP cylinder Inlet steam flow rate [t/h]	: 1375

Main generator

Rated active power [MWe]	: 220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 278.5
HP cylinder Inlet steam flow rate [t/h]	: 5870

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.4
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 278.5
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Cooling towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 49

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 3000
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	: 6430

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: 15Ch2MFA; 2,5%Cr0.6°Mo0,25%V
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: 08%Cr18%Ni10%Ti
Reactor vessel overall length/height [m]	: 12.95
Inside shell diameter [m]	: 4.136
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Hexagonal
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR/1%NB
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: -
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.16
Active core height/length [m]	: 3.53
Number of fissile fuel assemblies/bundles	: 163
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 76
Moderator weight [t]	: 330
Number of fuel elements per assembly/bundle	: 317
Fuel clad thickness [mm]	: 0.68
Average core power density [kW/dm ³]	: 108
Average fuel power density [kW/kgU]	: 46
Fuel linear heat generation rate [kW/m]	: 17.6

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: CRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 61

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 16
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 64000

Steam generators (SG)/drum separators

Type of SG	: Horizontal
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: 08CH18N10T SS
SG shell material	: 10GN3MFA alloyed carbon steel
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: 79
Number of safety valves	: 2
Number of relief valves	: 1
Installed heater power [kW]	: 2520

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: Spray
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1500
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 274.3
HP cylinder Inlet steam flow rate [t/h]	:

Main generator

Rated active power [MWe]	: 1000
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: 3
Number of motor-driven main feedwater pumps	: <Not Applicable>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Applicable>
Number of feedwater pumps required for full power operation	: 2
Feedwater discharge pressure [MPa]	: 7.6
Steam generator feedwater inlet temperature [°C]	: 220

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: 5
Number of diesel driven pumps	: <Not Applicable>
Number of turbine driven pumps	: <Not Applicable>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Applicable>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: 1
Number of on-site safety related diesel generators (available per unit)	: 3
Number of on-site safety related gas turbines (available per unit)	: <Not Applicable>
Number of on site non-safety related diesel generator	: 2
Number of on site non-safety related gas turbines	: <Not Applicable>
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	: 1
Total installed capacity of the on-site emergency power sources per unit [MW]	: 18.9
Total battery capacity [Ah]	: 1500

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

US-313

ARKANSAS ONE-1

UNITED STATES OF AMERICA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.77
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.673
Average core power density [kW/dm ³]	: 76
Average fuel power density [kW/kgU]	: 31.32
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 60

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.3
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 66000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.15
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 6.3
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 297
HP cylinder Inlet steam flow rate [t/h]	: 5562.4

Main generator

Rated active power [MWe]	: 903
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13.1
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 35000
Active core diameter [m]	: 3.12
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 73.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.625
Average core power density [kW/dm ³]	: 96.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 323
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 73680

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.08
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 276.1
HP cylinder Inlet steam flow rate [t/h]	: 5550

Main generator

Rated active power [MWe]	: 943
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 203
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 43727
Active core diameter [m]	: 3.05
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.817
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.06

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 20000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 4895

Main generator

Rated active power [MWe]	: 888
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 203
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 36351
Active core diameter [m]	: 3.05
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.406
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.573
Average core power density [kW/dm ³]	: 100
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.06

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 48

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 20000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.3
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 5265

Main generator

Rated active power [MWe]	: 888
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA 304
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 43
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.057
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.63
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7550

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA 304
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 43
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.057
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 20.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.63
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7550

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS!SA302B!SA336
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS SA371 ER309-ER308
Reactor vessel overall length/height [m]	: 22.1
Inside shell diameter [m]	: 6.37
Shell thickness [mm]	: 158.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 28
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 4.8
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 154
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 154
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 22.8
Fuel linear heat generation rate [kW/m]	: 18.25

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.2
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 51250

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 6063

Main generator

Rated active power [MWe]	: 1152
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS SA302B_SA336
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS SA371 ER309-ER308
Reactor vessel overall length/height [m]	: 22.1
Inside shell diameter [m]	: 6.37
Shell thickness [mm]	: 158.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 28
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 4.8
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 149.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 22.8
Fuel linear heat generation rate [kW/m]	: 18.49

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.2
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 51250

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 6063

Main generator

Rated active power [MWe]	: 1152
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B/SA-336
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS SA371 ER309-ER308
Reactor vessel overall length/height [m]	: 22.1
Inside shell diameter [m]	: 6.37
Shell thickness [mm]	: 158.7
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 32
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 4.8
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 149
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 149
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 23
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Boron Carbide SS
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.2
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 275
Coolant mass flow at the rated power [t/h]	: 51250

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 6063

Main generator

Rated active power [MWe]	: 1152
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.5
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 27800
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	: 23.3
Fuel linear heat generation rate [kW/m]	: 18.42

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 215
Coolant mass flow at the rated power [t/h]	: 7756

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4745

Main generator

Rated active power [MWe]	: 849.2
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 27800
Active core diameter [m]	: 4.1
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 102.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 1.81
Average core power density [kW/dm ³]	: 50.5
Average fuel power density [kW/kgU]	: 23.2
Fuel linear heat generation rate [kW/m]	: 18.61

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: <Not Available>
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 215
Coolant mass flow at the rated power [t/h]	: 7756

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m ²]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4745

Main generator

Rated active power [MWe]	: 849.2
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.19
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 43
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.057
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Other - WABA
Burnable neutron absorber material specification	: WABA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.63
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7550

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.19
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 43
Average discharge burnup [MWd/t]	: 49000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.057
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .42
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.63
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7550

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS300
Reactor vessel overall length/height [m]	: 13.3
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 109.2
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 19.13

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 329
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 69012

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 6513

Main generator

Rated active power [MWe]	: 1236
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS308-309
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.47
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 176
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 82.8
Average fuel power density [kW/kgU]	: 30.92
Fuel linear heat generation rate [kW/m]	: 20.62

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: B-4C/GD
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 314
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 63000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.52
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 5058

Main generator

Rated active power [MWe]	: 900
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS308/!309
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.47
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 176
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 82.8
Average fuel power density [kW/kgU]	: 30.92
Fuel linear heat generation rate [kW/m]	: 20.56

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C/EV
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 37

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 314
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 63000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.52
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 274
HP cylinder Inlet steam flow rate [t/h]	: 5058

Main generator

Rated active power [MWe]	: 880
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.7
Inside shell diameter [m]	: 4.6
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 39
Average discharge burnup [MWd/t]	: 40200
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 16406

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.04
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.83
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6488.7

Main generator

Rated active power [MWe]	: 1202
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.7
Inside shell diameter [m]	: 4.6
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 46
Average discharge burnup [MWd/t]	: 40200
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 44.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 20560

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.04
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.83
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6488.7

Main generator

Rated active power [MWe]	: 1205
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

US-461

CLINTON-1

UNITED STATES OF AMERICA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.3
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 137
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 45
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.3
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 624
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 105.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 52.4
Average fuel power density [kW/kgU]	: 25.77
Fuel linear heat generation rate [kW/m]	: 18.85

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.3
Reactor outlet temperature [°C]	: 288.3
Reactor inlet temperature [°C]	: 278.3
Coolant mass flow at the rated power [t/h]	: 38300

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .10
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.66
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 5143

Main generator

Rated active power [MWe]	: 985
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 22.7
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 162
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 20
Average discharge burnup [MWd/t]	: 42000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 128
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.69
Average core power density [kW/dm ³]	: 49.2
Average fuel power density [kW/kgU]	: 23.85
Fuel linear heat generation rate [kW/m]	: 43

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 8100

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.82
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.7
HP cylinder Inlet steam flow rate [t/h]	: 6133

Main generator

Rated active power [MWe]	: 1100
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.39
Shell thickness [mm]	: 219.2
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 84.497
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.81

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C/Al2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 67771

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.03
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6866

Main generator

Rated active power [MWe]	: 1175
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.38
Shell thickness [mm]	: 219.2
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 81.85
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.5
Fuel linear heat generation rate [kW/m]	: 17.81

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: WABA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 67771

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.03
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.75
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6866

Main generator

Rated active power [MWe]	: 1206
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.61
Shell thickness [mm]	: 142.9
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 12
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 17349
Active core diameter [m]	: 4.03
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 548
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 51.8
Average fuel power density [kW/kgU]	: 22.7
Fuel linear heat generation rate [kW/m]	: 43.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.28
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 186
Coolant mass flow at the rated power [t/h]	: 7755

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.83
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 4329

Main generator

Rated active power [MWe]	: 801
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.35
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 79.6
Average fuel power density [kW/kgU]	: 29.9
Fuel linear heat generation rate [kW/m]	: 18.67

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 8

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 317
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 19986

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.328
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 297
HP cylinder Inlet steam flow rate [t/h]	: 4819

Main generator

Rated active power [MWe]	: 890
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 11.9
Inside shell diameter [m]	: 4.3
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 50000
Active core diameter [m]	: 2.9
Active core height/length [m]	: 3.57
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 33.8
Fuel linear heat generation rate [kW/m]	: 21.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C/Al2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 68000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.22
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 307
HP cylinder Inlet steam flow rate [t/h]	: 4904

Main generator

Rated active power [MWe]	: 925
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.35
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.3
Average fuel power density [kW/kgU]	: 37.54
Fuel linear heat generation rate [kW/m]	: 17.5

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2 IN IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.83
Reactor outlet temperature [°C]	: 320
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 60270

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.31
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267.3
HP cylinder Inlet steam flow rate [t/h]	: 6925

Main generator

Rated active power [MWe]	: 1136
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.35
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.36
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2 IN IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.83
Reactor outlet temperature [°C]	: 321
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 60270

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.31
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267.3
HP cylinder Inlet steam flow rate [t/h]	: 7083

Main generator

Rated active power [MWe]	: 1164
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308/309/312
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 88.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 98.8
Average fuel power density [kW/kgU]	: 37
Fuel linear heat generation rate [kW/m]	: 21.98

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 14.76
Reactor outlet temperature [°C]	: 306
Reactor inlet temperature [°C]	: 273
Coolant mass flow at the rated power [t/h]	: 59502

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.12
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 264.1
HP cylinder Inlet steam flow rate [t/h]	: 5914.7

Main generator

Rated active power [MWe]	: 1089
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM-A-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308L/309L
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 81
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.8
Average fuel power density [kW/kgU]	: 36.5
Fuel linear heat generation rate [kW/m]	: 17.81

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 319
Reactor inlet temperature [°C]	: 283
Coolant mass flow at the rated power [t/h]	: 60292

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.43
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267.9
HP cylinder Inlet steam flow rate [t/h]	: 6074.7

Main generator

Rated active power [MWe]	: 1162
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304-L
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 6.3
Shell thickness [mm]	: 155.6
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 4.55
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 724
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 150
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 81
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 41.1
Average fuel power density [kW/kgU]	: 18.5
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7400

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .43
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.57
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281.3
HP cylinder Inlet steam flow rate [t/h]	: 4877

Main generator

Rated active power [MWe]	: 810
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304-L
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 6.3
Shell thickness [mm]	: 155.6
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 4.55
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 724
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 151
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 81
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 42.1
Average fuel power density [kW/kgU]	: 18.5
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 89

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7400

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .43
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.57
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281.3
HP cylinder Inlet steam flow rate [t/h]	: 4877

Main generator

Rated active power [MWe]	: 820
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 20.2
Inside shell diameter [m]	: 4.65
Shell thickness [mm]	: 117
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 32
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 27800
Active core diameter [m]	: 3.33
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 368
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 67.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 50.9
Average fuel power density [kW/kgU]	: 23.1
Fuel linear heat generation rate [kW/m]	: 14.4

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 89

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 22273

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.36
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 3096

Main generator

Rated active power [MWe]	: 565
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.2
Inside shell diameter [m]	: 6.36
Shell thickness [mm]	: 163.2
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 19404
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.8
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 140.3
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 24
Fuel linear heat generation rate [kW/m]	: 37.73

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BP/BORON INJ
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.3
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 6390

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 6435

Main generator

Rated active power [MWe]	: 1154
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM A 533B1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 203
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.02
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 101.1
Average fuel power density [kW/kgU]	: 32.3
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 45600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.27
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 5058

Main generator

Rated active power [MWe]	: 860
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM A 533B1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 203
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.02
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 101.1
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.1

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BORON
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 45600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.8
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.27
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 1760

Main generator

Rated active power [MWe]	: 860
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508-C
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.63
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 136.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 31800
Active core diameter [m]	: 3.26
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 100.82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 50.1
Average fuel power density [kW/kgU]	: 23
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.06
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 35000

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.8
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 4760

Main generator

Rated active power [MWe]	: 850
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: AS-304
Reactor vessel overall length/height [m]	: 9.8
Inside shell diameter [m]	: 3.94
Shell thickness [mm]	: 181
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 13500
Active core diameter [m]	: 2.7
Active core height/length [m]	: 3.25
Number of fissile fuel assemblies/bundles	: 133
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 47.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 176
Fuel clad thickness [mm]	: 0.75
Average core power density [kW/dm ³]	: 80.4
Average fuel power density [kW/kgU]	: 29
Fuel linear heat generation rate [kW/m]	: 49.93

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 14.8
Reactor outlet temperature [°C]	: 312
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 8136

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL - 600MA
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.85
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 2824

Main generator

Rated active power [MWe]	: 509
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CST-SS-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.3
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 156
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 28000
Active core diameter [m]	: 4.8
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 800
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 144.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 54.1
Average fuel power density [kW/kgU]	: 26.2
Fuel linear heat generation rate [kW/m]	: 19.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 193

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.31
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 7483

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.05
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.925
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7484.3

Main generator

Rated active power [MWe]	: 1372.5
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302/304-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.89
Inside shell diameter [m]	: 3.95
Shell thickness [mm]	: 237
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 70
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.762
Average core power density [kW/dm ³]	: 82.6
Average fuel power density [kW/kgU]	: 32
Fuel linear heat generation rate [kW/m]	: 43.96

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 45

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.71
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 15271

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.95
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.4
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 4349

Main generator

Rated active power [MWe]	: 775
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 17000
Active core diameter [m]	: 4.27
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 114
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 49.15
Average fuel power density [kW/kgU]	: 23.3
Fuel linear heat generation rate [kW/m]	: 18.4

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 279
Reactor inlet temperature [°C]	: 196
Coolant mass flow at the rated power [t/h]	: 4450

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.35
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 4565.4

Main generator

Rated active power [MWe]	: 850
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Stainless Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.1
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 140
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: <Not Available>
Fuel clad material specification	: -
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 18750
Active core diameter [m]	: 4.27
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 103.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 49.15
Average fuel power density [kW/kgU]	: 23.8
Fuel linear heat generation rate [kW/m]	: 18.4

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 137

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.07
Reactor outlet temperature [°C]	: 279
Reactor inlet temperature [°C]	: 218
Coolant mass flow at the rated power [t/h]	: 4450

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.35
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 2
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 4565.4

Main generator

Rated active power [MWe]	: 850
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.3
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 159
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 4.8
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 139.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 23.6
Fuel linear heat generation rate [kW/m]	: 17.52

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 45350

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.56
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 7424

Main generator

Rated active power [MWe]	: 1118
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.2
Inside shell diameter [m]	: 4.3
Shell thickness [mm]	: 218
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 88.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.617
Average core power density [kW/dm ³]	: 85
Average fuel power density [kW/kgU]	: 31.1
Fuel linear heat generation rate [kW/m]	: 18.81

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 309
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 15450

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: -
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.09
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 264
HP cylinder Inlet steam flow rate [t/h]	: 5291

Main generator

Rated active power [MWe]	: 1022
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.34
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 16
Average discharge burnup [MWd/t]	: 14000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 92.7
Average fuel power density [kW/kgU]	: 34.14
Fuel linear heat generation rate [kW/m]	: 21

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: WABA/ZRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 17.47
Reactor outlet temperature [°C]	: 315.8
Reactor inlet temperature [°C]	: 283.7
Coolant mass flow at the rated power [t/h]	: 25000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.3
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.028
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 264.4
HP cylinder Inlet steam flow rate [t/h]	: 5555

Main generator

Rated active power [MWe]	: 1030
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: AS
Reactor vessel overall length/height [m]	: 11.9
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 165
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 38900
Active core diameter [m]	: 2.45
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 46.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 94.9
Average fuel power density [kW/kgU]	: 30.4
Fuel linear heat generation rate [kW/m]	: 20.82

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 315
Reactor inlet temperature [°C]	: 279.9
Coolant mass flow at the rated power [t/h]	: 15467

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 4.95
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 3007

Main generator

Rated active power [MWe]	: 582
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 22.2
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 171.4
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.88
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 158
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.81
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 20.8
Fuel linear heat generation rate [kW/m]	: 44

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 8097

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .41
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.4
HP cylinder Inlet steam flow rate [t/h]	: 6475

Main generator

Rated active power [MWe]	: 1122
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 22.2
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 171.4
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.88
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 158
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 72
Fuel clad thickness [mm]	: 0.86
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 20.84
Fuel linear heat generation rate [kW/m]	: 44

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 274
Coolant mass flow at the rated power [t/h]	: 8097

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .41
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.4
HP cylinder Inlet steam flow rate [t/h]	: 6475

Main generator

Rated active power [MWe]	: 1122
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.4
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.57
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.711
Average core power density [kW/dm ³]	: 52.57
Average fuel power density [kW/kgU]	: 23.64
Fuel linear heat generation rate [kW/m]	: 16.4

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 282
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 7720

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .38
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 291
HP cylinder Inlet steam flow rate [t/h]	: 7410

Main generator

Rated active power [MWe]	: 1150
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.4
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 4.57
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 192
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.711
Average core power density [kW/dm ³]	: 52.6
Average fuel power density [kW/kgU]	: 23.64
Fuel linear heat generation rate [kW/m]	: 16.4

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 282
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 15500

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .38
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 291
HP cylinder Inlet steam flow rate [t/h]	: 7410

Main generator

Rated active power [MWe]	: 1150
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.7
Inside shell diameter [m]	: 4.6
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 37
Average discharge burnup [MWd/t]	: 40200
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 16046

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.04
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.83
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6488.7

Main generator

Rated active power [MWe]	: 1220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.7
Inside shell diameter [m]	: 4.6
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 39
Average discharge burnup [MWd/t]	: 40600
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.7
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 25

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 16046

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Spherical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.83
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6488.7

Main generator

Rated active power [MWe]	: 1220
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 4.37
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 87.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 176
Fuel clad thickness [mm]	: 0.9
Average core power density [kW/dm ³]	: 40.8
Average fuel power density [kW/kgU]	: 30.9
Fuel linear heat generation rate [kW/m]	: 18.5

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 49

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 312.7
Reactor inlet temperature [°C]	: 286.67
Coolant mass flow at the rated power [t/h]	: 13832

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.83
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.73
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: 5664.8

Main generator

Rated active power [MWe]	: 880
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: MNMO
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 3.33
Shell thickness [mm]	: 203
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 580
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 86.57
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.572
Average core power density [kW/dm ³]	: 78.5
Average fuel power density [kW/kgU]	: 33.19
Fuel linear heat generation rate [kW/m]	: 18.2

Reactivity control

Control rod material	: Carbon Steel
Burnable neutron absorber material	: <Not Available>
Burnable neutron absorber material specification	: -
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 24

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.9
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 21111

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.7
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: -
HP cylinder Inlet steam flow rate [t/h]	: 3478

Main generator

Rated active power [MWe]	: 1253
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CST-GRB-SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: ER308ELC
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 5.21
Shell thickness [mm]	: 131
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 75
Average discharge burnup [MWd/t]	: 27000
Active core diameter [m]	: 3.96
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 484
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 91.1
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 63
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 41.1
Average fuel power density [kW/kgU]	: 17.8
Fuel linear heat generation rate [kW/m]	: 39

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: 7/ASS
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 121

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 6800

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 44
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 1620

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Applicable>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.94
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285
HP cylinder Inlet steam flow rate [t/h]	: 3074

Main generator

Rated active power [MWe]	: 568
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B/CST
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308 / SS304
Reactor vessel overall length/height [m]	: 19.5
Inside shell diameter [m]	: 5.4
Shell thickness [mm]	: 181
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 22
Part of the core refuelled [%]	: 34
Average discharge burnup [MWd/t]	: 26000
Active core diameter [m]	: 4
Active core height/length [m]	: 3.7
Number of fissile fuel assemblies/bundles	: 532
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 93.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 63
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: 17.9
Fuel linear heat generation rate [kW/m]	: 15.5

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 129

Reactor coolant system

Number of external reactor coolant loops	: 5
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.13
Reactor outlet temperature [°C]	: 285
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 30612

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 5
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.36
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.79
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 3306

Main generator

Rated active power [MWe]	: 625
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 22.1
Inside shell diameter [m]	: 6.38
Shell thickness [mm]	: 164
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 26
Average discharge burnup [MWd/t]	: 32300
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 141
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.7
Average core power density [kW/dm ³]	: 49.15
Average fuel power density [kW/kgU]	: 22.08
Fuel linear heat generation rate [kW/m]	: 17.68

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 49206

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 7500

Main generator

Rated active power [MWe]	: 1214
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA533B1 SA508 II
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308INCONEL
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 199
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 108.7
Average fuel power density [kW/kgU]	: 33.88
Fuel linear heat generation rate [kW/m]	: 18.59

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 298
Coolant mass flow at the rated power [t/h]	: 16073

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.82
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 5417.8

Main generator

Rated active power [MWe]	: 984
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-308INCONEL
Reactor vessel overall length/height [m]	: 13.17
Inside shell diameter [m]	: 3.99
Shell thickness [mm]	: 199
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 108.7
Average fuel power density [kW/kgU]	: 38.4
Fuel linear heat generation rate [kW/m]	: 18.59

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 298
Coolant mass flow at the rated power [t/h]	: 16073

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.82
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272
HP cylinder Inlet steam flow rate [t/h]	: 5418.7

Main generator

Rated active power [MWe]	: 984
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 13.9
Inside shell diameter [m]	: 4.77
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 34
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94.1
Moderator weight [t]	: 240
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 83.4
Average fuel power density [kW/kgU]	: 30.9
Fuel linear heat generation rate [kW/m]	: 19

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 20000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCOLOY-800
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2520

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.13
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 297
HP cylinder Inlet steam flow rate [t/h]	: 5078

Main generator

Rated active power [MWe]	: 893
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA534
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.77
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 34
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 83.4
Average fuel power density [kW/kgU]	: 30.9
Fuel linear heat generation rate [kW/m]	: 19.06

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 20000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.13
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 297
HP cylinder Inlet steam flow rate [t/h]	: 5078

Main generator

Rated active power [MWe]	: 893
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA534
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-18-8
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.77
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 34
Average discharge burnup [MWd/t]	: 30000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 94.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 83.4
Average fuel power density [kW/kgU]	: 31.3
Fuel linear heat generation rate [kW/m]	: 19.06

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 28

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 20000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 5.13
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 297
HP cylinder Inlet steam flow rate [t/h]	: 5078

Main generator

Rated active power [MWe]	: 893
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B/CST
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 19.5
Inside shell diameter [m]	: 5.4
Shell thickness [mm]	: 181
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 4.07
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 560
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 125
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 60
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: 17
Fuel linear heat generation rate [kW/m]	: 47.6

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 5
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 271
Coolant mass flow at the rated power [t/h]	: 7723

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 5
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .43
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 3288

Main generator

Rated active power [MWe]	: 687.5
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B/CST
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.5
Inside shell diameter [m]	: 4.37
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 28
Average discharge burnup [MWd/t]	: 33205
Active core diameter [m]	: 3.47
Active core height/length [m]	: 3.34
Number of fissile fuel assemblies/bundles	: 204
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 81.428
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.749
Average core power density [kW/dm ³]	: 79.8
Average fuel power density [kW/kgU]	: 32.1
Fuel linear heat generation rate [kW/m]	: 25.73

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: GD 203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 14.48
Reactor outlet temperature [°C]	: 305
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 64366

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.87
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.18
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 265
HP cylinder Inlet steam flow rate [t/h]	: 4864

Main generator

Rated active power [MWe]	: 867
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 14.63
Inside shell diameter [m]	: 4.63
Shell thickness [mm]	: 230
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 3.65
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 241
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 99.03
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 95.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.14

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 76

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 296
Coolant mass flow at the rated power [t/h]	: 25288

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 288
HP cylinder Inlet steam flow rate [t/h]	: 8790

Main generator

Rated active power [MWe]	: 1303
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 14.63
Inside shell diameter [m]	: 4.63
Shell thickness [mm]	: 230
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 3.65
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 241
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 99.03
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 95.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.21

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 76

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 296
Coolant mass flow at the rated power [t/h]	: 25288

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 288
HP cylinder Inlet steam flow rate [t/h]	: 8790

Main generator

Rated active power [MWe]	: 1303
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 14.63
Inside shell diameter [m]	: 4.63
Shell thickness [mm]	: 230
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: -
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 38000
Active core diameter [m]	: 3.65
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 241
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 99.03
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 95.6
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 18.37

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 76

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 296
Coolant mass flow at the rated power [t/h]	: 25288

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.5
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 288
HP cylinder Inlet steam flow rate [t/h]	: 8790

Main generator

Rated active power [MWe]	: 1303
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASME-SA-336 / SA533B CC1339
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: SA-371-ER-309_ER-308
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 4.57
Active core height/length [m]	: 3.71
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 134.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.711
Average core power density [kW/dm ³]	: 50
Average fuel power density [kW/kgU]	: 22.8
Fuel linear heat generation rate [kW/m]	: 16.37

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7720

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 290.6
HP cylinder Inlet steam flow rate [t/h]	: 6062

Main generator

Rated active power [MWe]	: 1098
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASME-SA-336 / SA533B CC1339
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: SA-371-ER-309_ER-308
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 160
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 4.75
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 137.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 48.8
Average fuel power density [kW/kgU]	: 22.7
Fuel linear heat generation rate [kW/m]	: 18.24

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 277
Coolant mass flow at the rated power [t/h]	: 7720

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .16
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.65
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 290.6
HP cylinder Inlet steam flow rate [t/h]	: 6062

Main generator

Rated active power [MWe]	: 1098
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 21.74
Inside shell diameter [m]	: 6.045
Shell thickness [mm]	: 150
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 7614
Active core diameter [m]	: 4.65
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 748
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 152.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 54
Average fuel power density [kW/kgU]	: 26.25
Fuel linear heat generation rate [kW/m]	: 19.85

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 177

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.31
Reactor outlet temperature [°C]	: 285.5
Reactor inlet temperature [°C]	: 278.3
Coolant mass flow at the rated power [t/h]	: 6985

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.05
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 285.5
HP cylinder Inlet steam flow rate [t/h]	: 7000

Main generator

Rated active power [MWe]	: 1250
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 19.7
Inside shell diameter [m]	: 5.7
Shell thickness [mm]	: 145
Number of pressure channels	: <Not Applicable>
Pressure channel material	: Zircaloy
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 25000
Active core diameter [m]	: 4.14
Active core height/length [m]	: 3.69
Number of fissile fuel assemblies/bundles	: 580
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 113
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 62
Fuel clad thickness [mm]	: 0.812
Average core power density [kW/dm ³]	: 40.2
Average fuel power density [kW/kgU]	: 17.86
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 1
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.17
Reactor outlet temperature [°C]	: 296
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7650

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.97
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 3621

Main generator

Rated active power [MWe]	: 687
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 11.4
Inside shell diameter [m]	: 5.84
Shell thickness [mm]	: 165.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 74
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 50
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 87
Average fuel power density [kW/kgU]	: 32.1
Fuel linear heat generation rate [kW/m]	: 18.7

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 316
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 31900

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.55
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269
HP cylinder Inlet steam flow rate [t/h]	: 2777

Main generator

Rated active power [MWe]	: 524
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 11.4
Inside shell diameter [m]	: 5.84
Shell thickness [mm]	: 165.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 74
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 2.44
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 51
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 88
Average fuel power density [kW/kgU]	: 32.1
Fuel linear heat generation rate [kW/m]	: 18.7

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 316
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 31800

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.55
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 269
HP cylinder Inlet steam flow rate [t/h]	: 2777

Main generator

Rated active power [MWe]	: 524
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304 INCONEL
Reactor vessel overall length/height [m]	: 11.9
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 178
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 20
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 51000
Active core diameter [m]	: 2.45
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 33.8
Fuel linear heat generation rate [kW/m]	: 20.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 315
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.91
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.06
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 3165

Main generator

Rated active power [MWe]	: 560
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304 INCONEL
Reactor vessel overall length/height [m]	: 11.9
Inside shell diameter [m]	: 3.35
Shell thickness [mm]	: 178
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 20
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 51000
Active core diameter [m]	: 2.45
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42.9
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 95
Average fuel power density [kW/kgU]	: 33.8
Fuel linear heat generation rate [kW/m]	: 20.3

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 21

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 315
Reactor inlet temperature [°C]	: 280
Coolant mass flow at the rated power [t/h]	: 15470

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 2.91
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.06
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 263
HP cylinder Inlet steam flow rate [t/h]	: 3165

Main generator

Rated active power [MWe]	: 560
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304-L
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 155.6
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 4.55
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 724
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 150
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.84
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: 18.4
Fuel linear heat generation rate [kW/m]	: 43.96

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 177

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7400

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .43
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.57
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281.3
HP cylinder Inlet steam flow rate [t/h]	: 3898

Main generator

Rated active power [MWe]	: 810
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304-L
Reactor vessel overall length/height [m]	: 21
Inside shell diameter [m]	: 6.4
Shell thickness [mm]	: 155.6
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 47000
Active core diameter [m]	: 4.55
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 724
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 150
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.84
Average core power density [kW/dm ³]	: 40.6
Average fuel power density [kW/kgU]	: 18.3
Fuel linear heat generation rate [kW/m]	: 43.96

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: Gd 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 177

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.1
Reactor outlet temperature [°C]	: 286
Reactor inlet temperature [°C]	: 276
Coolant mass flow at the rated power [t/h]	: 7400

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .43
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.57
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 281.3
HP cylinder Inlet steam flow rate [t/h]	: 3898

Main generator

Rated active power [MWe]	: 810
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS304
Reactor vessel overall length/height [m]	: 11.2
Inside shell diameter [m]	: 3.352
Shell thickness [mm]	: 165
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 74
Average discharge burnup [MWd/t]	: 39000
Active core diameter [m]	: 2.46
Active core height/length [m]	: 3.59
Number of fissile fuel assemblies/bundles	: 121
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 42.61
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 179
Fuel clad thickness [mm]	: 0.6
Average core power density [kW/dm ³]	: 88.9
Average fuel power density [kW/kgU]	: 31.2
Fuel linear heat generation rate [kW/m]	: 19.02

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 17

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 317
Reactor inlet temperature [°C]	: 284
Coolant mass flow at the rated power [t/h]	: 29940

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.23
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.1
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 264
HP cylinder Inlet steam flow rate [t/h]	: 2849

Main generator

Rated active power [MWe]	: 498
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 533-B
Vessel cladding material	: Alloyed Steel
Vessel cladding material specification	: AS-SAF-5.9
Reactor vessel overall length/height [m]	: 21.29
Inside shell diameter [m]	: 5.54
Shell thickness [mm]	: 152
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 25
Average discharge burnup [MWd/t]	: 29600
Active core diameter [m]	: 4.29
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 624
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 112.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 64
Fuel clad thickness [mm]	: 0.813
Average core power density [kW/dm ³]	: 52.4
Average fuel power density [kW/kgU]	: 25.9
Fuel linear heat generation rate [kW/m]	: 18.86

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 145

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.56
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 278
Coolant mass flow at the rated power [t/h]	: 7400

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.05
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.78
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.4
HP cylinder Inlet steam flow rate [t/h]	: 5647

Main generator

Rated active power [MWe]	: 991
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM A 533/508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 114.3
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.6
Average fuel power density [kW/kgU]	: 37.7
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 65600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 5400

Main generator

Rated active power [MWe]	: 1132
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: ASTM A 533/508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 114.3
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 40000
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.6
Average fuel power density [kW/kgU]	: 38.5
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 285
Coolant mass flow at the rated power [t/h]	: 66000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 268
HP cylinder Inlet steam flow rate [t/h]	: 5547

Main generator

Rated active power [MWe]	: 1158
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.22
Inside shell diameter [m]	: 4.81
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 22
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.641
Average core power density [kW/dm ³]	: 70.4
Average fuel power density [kW/kgU]	: 37.9
Fuel linear heat generation rate [kW/m]	: 18.4

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 83

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 321.6
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 16818

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed+Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 278
HP cylinder Inlet steam flow rate [t/h]	: 6523

Main generator

Rated active power [MWe]	: 1181
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B/SA-508
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.22
Inside shell diameter [m]	: 4.81
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.641
Average core power density [kW/dm ³]	: 94.9
Average fuel power density [kW/kgU]	: 37.9
Fuel linear heat generation rate [kW/m]	: 18.4

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 49

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 321.6
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 16818

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 8.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 278
HP cylinder Inlet steam flow rate [t/h]	: 6523

Main generator

Rated active power [MWe]	: 1181
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: -
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.36
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 216
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 101
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 43.6
Average fuel power density [kW/kgU]	: 38.92
Fuel linear heat generation rate [kW/m]	: 17.18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 57

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 64445

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: Water Condenser
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.7
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.14
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 288
HP cylinder Inlet steam flow rate [t/h]	: 7520

Main generator

Rated active power [MWe]	: 1200
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.3
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 215
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 37
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.27
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.8
Average fuel power density [kW/kgU]	: -
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: WABA/IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 322.4
Reactor inlet temperature [°C]	: 285.9
Coolant mass flow at the rated power [t/h]	: 62600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.84
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.85
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272.6
HP cylinder Inlet steam flow rate [t/h]	: 6465.7

Main generator

Rated active power [MWe]	: 1221
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CST-SS-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.3
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 37
Average discharge burnup [MWd/t]	: 45000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 103.8
Average fuel power density [kW/kgU]	: 38.5
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: WABA/IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 322.4
Reactor inlet temperature [°C]	: 286
Coolant mass flow at the rated power [t/h]	: 62600

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Double
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m ³]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 0.84
Design leakage rate [% per day]	: -
Type of H ₂ recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.85
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 272.6
HP cylinder Inlet steam flow rate [t/h]	: 7127

Main generator

Rated active power [MWe]	: 1221
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533/304-CLAD
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 204
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 31500
Active core diameter [m]	: 3.03
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 73.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.559
Average core power density [kW/dm ³]	: 105
Average fuel power density [kW/kgU]	: 39.6
Fuel linear heat generation rate [kW/m]	: -

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B2O3
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 52

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 290
Coolant mass flow at the rated power [t/h]	: 16480

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.56
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 280
HP cylinder Inlet steam flow rate [t/h]	: 5100

Main generator

Rated active power [MWe]	: 950
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 5.57
Shell thickness [mm]	: 213
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 16.7
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.27
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 117.82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 98
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.03

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 330
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 64150

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.97
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 7.55
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 289.6
HP cylinder Inlet steam flow rate [t/h]	: 7012

Main generator

Rated active power [MWe]	: 1312
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 5.57
Shell thickness [mm]	: 213
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 16.7
Average discharge burnup [MWd/t]	: 43000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 4.27
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 117.82
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 98.8
Average fuel power density [kW/kgU]	: 36.6
Fuel linear heat generation rate [kW/m]	: 17.03

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSILICATE
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 330
Reactor inlet temperature [°C]	: 293
Coolant mass flow at the rated power [t/h]	: 64150

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.97
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	:
Number of IP cylinders per turbine	:
Number of LP cylinders per turbine	:
HP cylinder inlet steam pressure [MPa]	: 7.55
HP cylinder Inlet steam moisture [%]	:
HP cylinder inlet steam temperature [°C]	: 289.6
HP cylinder Inlet steam flow rate [t/h]	: 7012

Main generator

Rated active power [MWe]	: 1312
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	:
Output frequency [Hz]	:

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: <Not Available>

Number of main condensate pumps	:
Number of main condensate pumps required for full power	:
Condenser vacuum at the full power (absolute pressure) [kPa]	:

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	:
Feedwater discharge pressure [MPa]	:
Steam generator feedwater inlet temperature [°C]	:

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	:
Cable segregation within the unit used for	:
On-site fire brigade	:
Off-site fire brigade response time	:

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	:
Number of on site non-safety related gas turbines	:
Other on-site emergency AC power sources	:
Estimated time reserve of the batteries at full load [h]	:
Total installed capacity of the on-site emergency power sources per unit [MW]	:
Total battery capacity [Ah]	:

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA- 533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 4.8
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.47
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 92.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 176
Fuel clad thickness [mm]	: 0.66
Average core power density [kW/dm ³]	: 83.2
Average fuel power density [kW/kgU]	: 31
Fuel linear heat generation rate [kW/m]	: 19.4

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Gadolinium/Boron
Burnable neutron absorber material specification	: GD 203/B-4C/Al203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 73

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.5
Reactor outlet temperature [°C]	: 314
Reactor inlet temperature [°C]	: 287
Coolant mass flow at the rated power [t/h]	: 55337

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 4739

Main generator

Rated active power [MWe]	: 842
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-CIB
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.5
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 35
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.47
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 92.7
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.635
Average core power density [kW/dm ³]	: 83.2
Average fuel power density [kW/kgU]	: 31.3
Fuel linear heat generation rate [kW/m]	: 14.5

Reactivity control

Control rod material	: Boron Carbide/Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C/Al ₂ O ₃
Soluble neutron absorber material	: Boric Acid H ₃ BO ₃
Secondary shutdown system	: -
Number of control rod assemblies	: 91

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H ₂ O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 314
Reactor inlet temperature [°C]	: 288
Coolant mass flow at the rated power [t/h]	: 63049

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.38
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 267
HP cylinder Inlet steam flow rate [t/h]	: 4733

Main generator

Rated active power [MWe]	: 935
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-2/CS ASTM-A-533B CLASS 1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304 INCONEL SA-B-16
Reactor vessel overall length/height [m]	: 12.32
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4,ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 38
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 3.035
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.38
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.617
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 34.6
Fuel linear heat generation rate [kW/m]	: 21.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: A1B4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 283
Coolant mass flow at the rated power [t/h]	: 67000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 4506

Main generator

Rated active power [MWe]	: 850
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

US-281

SURRY-2

UNITED STATES OF AMERICA

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-508-CL-2/CS ASTM-A-533B CLASS 1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304 INCONEL SA-B-16
Reactor vessel overall length/height [m]	: 12.3
Inside shell diameter [m]	: 3.4
Shell thickness [mm]	: 200
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4,ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 38
Average discharge burnup [MWd/t]	: 48000
Active core diameter [m]	: 3.035
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 72.41
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.617
Average core power density [kW/dm ³]	: 92
Average fuel power density [kW/kgU]	: 34.6
Fuel linear heat generation rate [kW/m]	: 21.6

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: A1B4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 283
Coolant mass flow at the rated power [t/h]	: 67000

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m ²]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m ³]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.22
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.59
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 270
HP cylinder Inlet steam flow rate [t/h]	: 4506

Main generator

Rated active power [MWe]	: 850
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.3
Shell thickness [mm]	: 163.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 4.57
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 133.2
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 79
Fuel clad thickness [mm]	: 0.76
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 23.82
Fuel linear heat generation rate [kW/m]	: 19.32

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.19
Reactor outlet temperature [°C]	: 304
Reactor inlet temperature [°C]	: 195
Coolant mass flow at the rated power [t/h]	: 6170

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.72
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.69
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.2
HP cylinder Inlet steam flow rate [t/h]	: 7075

Main generator

Rated active power [MWe]	: 1134
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 22
Inside shell diameter [m]	: 6.3
Shell thickness [mm]	: 163.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 30
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 4.57
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 764
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 132.3
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 79
Fuel clad thickness [mm]	: 0.76
Average core power density [kW/dm ³]	: 48.7
Average fuel power density [kW/kgU]	: 23.82
Fuel linear heat generation rate [kW/m]	: 14.32

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 185

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.19
Reactor outlet temperature [°C]	: 287
Reactor inlet temperature [°C]	: 195
Coolant mass flow at the rated power [t/h]	: 6170

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.72
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.69
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.2
HP cylinder Inlet steam flow rate [t/h]	: 7075

Main generator

Rated active power [MWe]	: 1134
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: -
Reactor vessel overall length/height [m]	: 12.4
Inside shell diameter [m]	: 4.34
Shell thickness [mm]	: 214
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: Pellets
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 24
Part of the core refuelled [%]	: 40
Average discharge burnup [MWd/t]	: 54000
Active core diameter [m]	: 3.27
Active core height/length [m]	: 3.6
Number of fissile fuel assemblies/bundles	: 177
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 82.1
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 208
Fuel clad thickness [mm]	: 0.67
Average core power density [kW/dm ³]	: 84.7
Average fuel power density [kW/kgU]	: 30.44
Fuel linear heat generation rate [kW/m]	: 18.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 32

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 14.9
Reactor outlet temperature [°C]	: 318
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 65771

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: Straight
Tube material	: INCONEL-600S
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: <Not Available>
Additional pressure suppression system	: <Not Available>

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: .38
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: <Not Available>
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.28
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 311
HP cylinder Inlet steam flow rate [t/h]	: 4790

Main generator

Rated active power [MWe]	: 871
Rated apparent power [MVA]	: <Not Available>
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-GR-B; ASTM A-508B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.8
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 200.8
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 79.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 82.8
Average fuel power density [kW/kgU]	: 30.9
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: WABA/IFBA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 338
Reactor inlet temperature [°C]	: 285.7
Coolant mass flow at the rated power [t/h]	: 46039

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: Cylindrical
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.13
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 4068

Main generator

Rated active power [MWe]	: 728
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-302-GR-B; ASTM A-508B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.65
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 200.8
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 79.8
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 204
Fuel clad thickness [mm]	: 0.62
Average core power density [kW/dm ³]	: 82.8
Average fuel power density [kW/kgU]	: 30.9
Fuel linear heat generation rate [kW/m]	: 18

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Others
Burnable neutron absorber material specification	: WABA
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 29

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.7
Reactor outlet temperature [°C]	: 338
Reactor inlet temperature [°C]	: 285.7
Coolant mass flow at the rated power [t/h]	: 46039

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.1
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 5.13
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 266
HP cylinder Inlet steam flow rate [t/h]	: 4068

Main generator

Rated active power [MWe]	: 728
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Sea (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: CS SA-533B
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS ER-309
Reactor vessel overall length/height [m]	: 19.2
Inside shell diameter [m]	: 5.2
Shell thickness [mm]	: 133
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-2
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 16
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33760
Active core diameter [m]	: 3.3
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 368
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 65.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 61
Fuel clad thickness [mm]	: 0.812
Average core power density [kW/dm ³]	: 50.96
Average fuel power density [kW/kgU]	: 22.4
Fuel linear heat generation rate [kW/m]	: 42.5

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Gadolinium
Burnable neutron absorber material specification	: GD 203
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 7.13
Reactor outlet temperature [°C]	: 288
Reactor inlet temperature [°C]	: 189
Coolant mass flow at the rated power [t/h]	: 1116

Steam generators (SG)/drum separators

Type of SG	: <Not Applicable>
SG output	: <Not Available>
Number of SG	: <Not Applicable>
Number of drum separators	: <Not Applicable>
Tube shape	: <Not Applicable>
Tube material	: <Not Applicable>
SG shell material	: <Not Applicable>
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: <Not Applicable>
Design heat transfer surface [m2]	: <Not Applicable>

Main coolant pumps/circulators

Total number of pumps/circulators	: 2
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Confinement
Containment Shape	: <Not Available>
Containment structure	: <Not Available>
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.9
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.68
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282
HP cylinder Inlet steam flow rate [t/h]	: 2913

Main generator

Rated active power [MWe]	: 540
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.33
Inside shell diameter [m]	: 4
Shell thickness [mm]	: 197
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4,ZIRLO
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 43.3
Average discharge burnup [MWd/t]	: 38900
Active core diameter [m]	: 3.04
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 157
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 65.42
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 38.3
Fuel linear heat generation rate [kW/m]	: 17.83

Reactivity control

Control rod material	: Cadmium Alloy
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: ZRB-2
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: -

Reactor coolant system

Number of external reactor coolant loops	: 3
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 327
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 47400

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 3
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-690
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 3
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Reinforced Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 8.33
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 315.6
HP cylinder Inlet steam flow rate [t/h]	: 5538.5

Main generator

Rated active power [MWe]	: 933
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Lake (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 222
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36400
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 111.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 33.7
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al2O3/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 64500

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.65
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.81
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 7283.5

Main generator

Rated active power [MWe]	: 1157
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Carbon Steel
Reactor vessel material specification	: CS
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 222
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 36400
Active core diameter [m]	: 3.4
Active core height/length [m]	: 3.66
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 111.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 104.5
Average fuel power density [kW/kgU]	: 33.7
Fuel linear heat generation rate [kW/m]	: 17.8

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al2O3/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.82
Reactor outlet temperature [°C]	: 325
Reactor inlet temperature [°C]	: 291
Coolant mass flow at the rated power [t/h]	: 64500

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL-600TT
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: Single
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete+Steel
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.65
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.81
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 284
HP cylinder Inlet steam flow rate [t/h]	: 7283.5

Main generator

Rated active power [MWe]	: 1157
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.3
Inside shell diameter [m]	: 4.37
Shell thickness [mm]	: 192.5
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33
Average discharge burnup [MWd/t]	: 33450
Active core diameter [m]	: 3.45
Active core height/length [m]	: 3.81
Number of fissile fuel assemblies/bundles	: 217
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.5
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 236
Fuel clad thickness [mm]	: 0.64
Average core power density [kW/dm ³]	: 94.9
Average fuel power density [kW/kgU]	: 39.6
Fuel linear heat generation rate [kW/m]	: 17.52

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al203/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 41

Reactor coolant system

Number of external reactor coolant loops	: 2
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 322
Reactor inlet temperature [°C]	: 289
Coolant mass flow at the rated power [t/h]	: 67100

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 2
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 2
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: 79
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: 2520

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 3.09
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.05
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 275
HP cylinder Inlet steam flow rate [t/h]	: 6303

Main generator

Rated active power [MWe]	: 1153
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: River (once-through)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533-B-CL-1
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS
Reactor vessel overall length/height [m]	: 13.4
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 215.1
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 32
Average discharge burnup [MWd/t]	: 36000
Active core diameter [m]	: 3.37
Active core height/length [m]	: 3.65
Number of fissile fuel assemblies/bundles	: 193
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 88.6
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 102.1
Average fuel power density [kW/kgU]	: 38.6
Fuel linear heat generation rate [kW/m]	: 17.88

Reactivity control

Control rod material	: Boron Carbide
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: BOROSIL GLASS
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 33

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.71
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15910

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Steel+Concrete
Pressure suppression system	: Ice Condenser
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 1.05
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.85
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 283
HP cylinder Inlet steam flow rate [t/h]	: 6464

Main generator

Rated active power [MWe]	: 1270
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Towers
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -

Design Characteristics

Primary Systems

Reactor pressure vessel

Reactor vessel shape	: Cylindrical, Hemispherical End
Reactor vessel centreline orientation	: Vertical
Reactor vessel material	: Alloyed Steel
Reactor vessel material specification	: SA-533
Vessel cladding material	: Stainless Steel
Vessel cladding material specification	: SS-304
Reactor vessel overall length/height [m]	: 12.9
Inside shell diameter [m]	: 4.4
Shell thickness [mm]	: 219
Number of pressure channels	: <Not Applicable>
Pressure channel material	: <Not Applicable>
Pressure channel wall thickness [mm]	: <Not Applicable>

Reactor Core

Fuel assembly geometry	: Square
Fuel Form	: <Not Available>
Fuel material	: UO ₂
Refuelling type	: OFF-line
Moderator material	: H ₂ O
Fuel clad material	: Zirconium Alloy
Fuel clad material specification	: ZR-4
Average fuel enrichment [% of U235]	: -
Refuelling frequency [month]	: 18
Part of the core refuelled [%]	: 33.3
Average discharge burnup [MWd/t]	: 33000
Active core diameter [m]	: 6.3
Active core height/length [m]	: 5.94
Number of fissile fuel assemblies/bundles	: 22
Number of fertile fuel assemblies (for FBR, N/A for other reactors)	: <Not Applicable>
Fuel weight [t]	: 89.4
Moderator weight [t]	: -
Number of fuel elements per assembly/bundle	: 264
Fuel clad thickness [mm]	: 0.57
Average core power density [kW/dm ³]	: 101.9
Average fuel power density [kW/kgU]	: 38.4
Fuel linear heat generation rate [kW/m]	: 17.85

Reactivity control

Control rod material	: Boron Carbide/Hafnium
Burnable neutron absorber material	: Boron
Burnable neutron absorber material specification	: Al2O3/B-4C
Soluble neutron absorber material	: Boric Acid H3BO3
Secondary shutdown system	: -
Number of control rod assemblies	: 53

Reactor coolant system

Number of external reactor coolant loops	: 4
Coolant type	: H2O
Coolant weight [t]	: -
Operating coolant pressure [MPa]	: 15.8
Reactor outlet temperature [°C]	: 326
Reactor inlet temperature [°C]	: 292
Coolant mass flow at the rated power [t/h]	: 15900

Steam generators (SG)/drum separators

Type of SG	: Vertical
SG output	: <Not Available>
Number of SG	: 4
Number of drum separators	: <Not Applicable>
Tube shape	: U-tube
Tube material	: INCONEL 600
SG shell material	: -
Drum separator shell material	: <Not Applicable>
Design thermal capacity per SG [MW]	: -
Design heat transfer surface [m2]	: -

Main coolant pumps/circulators

Total number of pumps/circulators	: 4
Number of pumps per RCS loop	: 1
Pump motor rating [MW]	: -
Design pressure difference [MPa]	: -

Pressurizer

Total volume [m3]	: <Not Available>
Number of safety valves	: <Not Available>
Number of relief valves	: <Not Available>
Installed heater power [kW]	: -

Containment systems

Containment type	: <Not Available>
Containment Shape	: <Not Available>
Containment structure	: Pre-stressed Concrete
Pressure suppression system	: -
Additional pressure suppression system	: -

Total containment volume [m3]	: -
Number of containment spray pumps	: -
Containment design pressure [MPa]	: 4.2
Design leakage rate [% per day]	: -
Type of H2 recombiner	: -

Emergency core cooling systems

Number of HPSI systems	: <Not Available>
Number of LPSI systems	: <Not Available>
Number of hydroaccumulators	: <Not Available>
Number of core spray system pumps (BWR)	: <Not Available>
HPSI systems pressure [MPa]	: -
LPSI system pressure [MPa]	: -
HPSI system flowrate [t/h]	: -
LPSI system flowrate [t/h]	: -

Reactor protection system

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Engineered Safeguard Feature Actuation System

Control equipment technology	: -
Number of independent system divisions	: <Not Available>

Secondary systems

Turbine

Turbine type	: <Not Available>
Number of turbine-generators per unit/reactor	: 1
Turbine speed [rpm]	: 1800
Number of HP cylinders per turbine	: -
Number of IP cylinders per turbine	: -
Number of LP cylinders per turbine	: -
HP cylinder inlet steam pressure [MPa]	: 6.86
HP cylinder Inlet steam moisture [%]	: -
HP cylinder inlet steam temperature [°C]	: 282.2
HP cylinder Inlet steam flow rate [t/h]	: 7191.4

Main generator

Rated active power [MWe]	: 1233
Rated apparent power [MVA]	: -
Output voltage [kV]	: -
Output frequency [Hz]	: -

Main condenser

Primary means of condenser cooling	: Cooling Pond (closed-cycle)
Number of condensers per turbine-generator	: <Not Available>
Condenser tube material	: -

Number of main condensate pumps	: -
Number of main condensate pumps required for full power	: -
Condenser vacuum at the full power (absolute pressure) [kPa]	: -

Feedwater system

Number of turbine driven main feedwater pumps	: <Not Available>
Number of motor-driven main feedwater pumps	: <Not Available>
Number of start-up feed-water pumps (if different from the auxiliary FWP)	: <Not Available>
Number of feedwater pumps required for full power operation	: -
Feedwater discharge pressure [MPa]	: -
Steam generator feedwater inlet temperature [°C]	: -

Auxiliary / Emergency feedwater

Number of electrical motor-driven pumps	: <Not Available>
Number of diesel driven pumps	: <Not Available>
Number of turbine driven pumps	: <Not Available>

Fire protection system

On-site fire suppression/extinguishing system	: <Not Available>
Fire retardant cable coating used for	: -
Cable segregation within the unit used for	: -
On-site fire brigade	: -
Off-site fire brigade response time	: -

Emergency power supply systems

Number of alternate power sources from the neighbouring units (available per unit)	: <Not Available>
Number of alternate power sources from the transmission grid (standby transformers available per unit)	: <Not Available>
Number of on-site safety related diesel generators (available per unit)	: <Not Available>
Number of on-site safety related gas turbines (available per unit)	: <Not Available>
Number of on site non-safety related diesel generator	: -
Number of on site non-safety related gas turbines	: -
Other on-site emergency AC power sources	: -
Estimated time reserve of the batteries at full load [h]	: -
Total installed capacity of the on-site emergency power sources per unit [MW]	: -
Total battery capacity [Ah]	: -

Spent fuel storage

Reactor building spent fuel pool capacity (number of spent fuel assemblies)	: <Not Available>
Interim storage facility type	: <Not Available>
Interim storage facility capacity (number of spent fuel assemblies)	: -

Non-electrical applications

Primary heat connection	: <Not Available>
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Number of heat connection points per unit	: <Not Available>
Number of intermediate circuits/heat exchangers	: <Not Available>
Total capacity of heat connections [MWt]	: -
Extraction steam pressure [MPa]	: -