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MANHATTAN DISTRICT HISTORY
BOOK VIII - LOS ALAMOS PROJECT (Y)
VOLUME 1 - GENERAL

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December 1947.

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APPENDICES

This volume of the Manhattan Engineer District History has been prepared to give a concise account of the non-scientific part of the "Y" Project (the Project at Los Alamos, New Mexico), from its inception through 1946, at which time the Atomic Energy Commission assumed control. It is intended that this supplement the technical history, which will be found in Volume 2 of this book.

The ultimate achievements performed at Project "Y" are well known. Little may be said adding to this page of world history. It is the purpose of this record to present the facts of construction, organization and personnel and of various problems faced and met, by the group of people who were responsible for assisting in the final accomplishment of the task set for Los Alamos - the statistics and facts behind the goal.

One of the chief difficulties in securing data for this volume arose from restrictions necessarily placed by security on the early operations of the Project. Many of the transactions were carried on orally to insure secrecy, and thus no written record was preserved. In other instances, data were destroyed to further protect the secret of the bomb. This complete secrecy was one of the most amazing aspects of the entire program, but it produced one of the obstacles hardest to hurdle when attempting to piece the story together for historical purposes.

Fortunately, many of the persons involved in the founding of Los Alamos were still at the Project, could supply facts from actual experience, and could authenticate events by the few records existing. Their assistance and cooperation were invaluable.

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SUMMARY

1. General. - It was determined by October 1942 that a new site was necessary to develop and test the atomic bomb under the supervision of the Manhattan District. For security reasons the project was known as Project "Y", and the site was called a "Demolition Range". The site which was chosen, after investigation by proper authorities, was near Santa Fe, within Sandoval County. Lt. Colonel J. M. Harman (later promoted to Colonel) was selected as Commanding Officer. The University of California was selected as contractor for the administration of the technical work.

2. Site Selection. - Various requirements of security, accessibility, isolation, protection from hazards, and utilities were considered before a New Mexico location was finally decided upon. Then the possibilities of various alternate sites in New Mexico were investigated by Lt. Col. W. H. Dudley and the U.S. Engineer Office of Albuquerque, and discussed with Dr. Oppenheimer. The Los Alamos Ranch School, Otowi, appeared to present the greatest potentialities. Major General L. R. Groves authorized this site to become Project "Y".

The project is located in a rural area of the Jemez Mountains in the North central portion of New Mexico. Santa Fe is about twenty air miles from the site; Santa Fe is also the railhead for a branch of the A.T.&S.F. Railroad which joins the main line at Lamy, New Mexico. Two routes from highway No. 285 give access to the Project. The shorter route is via State Highway No. 4. This road is secondary in construction, and subject to inundation which at times makes vehicle travel impossible.

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The longer route, State Highway No. 5, through Espanola, has better alignment and surface than the route via Highway No. 4. Traffic is occasionally interrupted by high water, but not so frequently as on the shorter route. The State Highway Department has constructed a first class highway from the junction of No. 4 and No. 5, to the Post. From the Technical area of the Project to the Plaza at Santa Fe via the shorter route is about 35 miles; via the longer it is 45 miles. There is also an unimproved road from the West gate to the Project via Valle Grande to Albuquerque. This route is very rough and not frequently used.

Two thirds of the reservation is a rather flat benchland between the Rio Grande and the Jemez Mountains. The other third includes the mountain slopes, with elevations from 8000 to 9000 feet, and deep box-type canyons. Two original properties (Los Alamos Ranch School and Anchor Ranch) had 85 established buildings, many of which could be remodeled for employees' housing, and stores. The name Los Alamos was considered classified information and many other titles were used, including "The Hill" and "Y".

3. Land Acquisition. - On 25 November 1942, the Under Secretary of War directed the acquisition of the land required by the Office of the Chief of Engineers. The Secretary of Agriculture granted authority on 3 April 1943, for use of 45,100 acres of federally owned land, subject to certain provisions of fire prevention and control. Grazing permits in this area were withdrawn. The privately owned land was either purchased or condemned by authority contained in the 2nd War Powers Act. In order to speed up the transaction, Declaration of Taking proceedings were instituted which eliminated any title defects and gave the

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Government immediate acquisition without direct negotiation with the owners. Appraisals were made as required by law, based upon factors affecting market values and prevailing prices for comparable land. There were a few objectors to the prices offered by the Government; however, sixteen stipulations were secured, indicating that the prices were satisfactory. Legal transactions were handled by the Southwestern Division Real Estate Sub-Office with only the usual requirements of condemnation proceedings. The only irregularities in the Project boundary were caused by the Bandelier National Monument and an Indian Sacred Burial Ground bordering the southeastern portion. The right to start surveying the Los Alamos Ranch school area was granted on 23 November 1942, and this greatly facilitated early construction. Although exclusive jurisdiction was accepted by the Secretary of War, there is still some question as to the extent of U.S. jurisdiction.

A required area of 54,000 acres was originally estimated, this was decreased to 49,383 acres, including: 45,737 acres from Government agencies; 3,600 acres purchased from individuals; 40 acres leased by the War Department; 6 acres acquired for the power line right of way across private land, and state land.

The total cost for all lands acquired in fee simple, easement and lease was \$414,971.00, in contrast to the original appraisal estimate of \$444,000.00

4. Design and Engineering.- The supervision of design and engineering was under the Albuquerque Engineer District until 15 March 1944 when it was assumed by the Manhattan Engineer District. The firm of W. C. Kruger, Architect-Engineer, had been selected under the

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Albuquerque District and continued its work after this transfer was made. This firm maintained a competent staff and was advantageously located in Santa Fe. Their fees were proportional to those for other work done for the Albuquerque Engineer District, on other projects. In December 1945, Black and Veatch were engaged for utility designing and engineering. The construction plan for the new post was to provide housing for military and civilian personnel and necessary administration, utilities and technical buildings. This included conversion of existing buildings as well as planning utilities. Normally, Technical Area units to be designed were sketched by the Operating Contractor, and then checked for accuracy by the Engineering Division before the plans were transmitted to the Architect-Engineer for completion. This close liaison minimized delay and tended to reduce costs. W. C. Kruger, Architect-Engineer, has received \$743,706.68 through 1946. Black and Veatch was paid \$164,116.00 through the same year.

5. Construction. - The Albuquerque Engineer District likewise supervised all construction work until 15 March 1944 (with one exception, as hereinafter noted); and it was responsible for construction work totaling about \$9,300,000. The Manhattan District supervised, approximately, an additional \$30,400,000 in building to the end of 1946. Contracts were awarded to reputable firms, their selection being determined primarily by their ability to do the best job in the given time limit. M. M. Sundt was selected to begin construction, and inasmuch as this firm also had plumbing, electrical and painting departments, it was the only contractor originally on the project, except A. O. Peabody, who was awarded the road building contract.

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The necessity for all-weather streets and roads was extremely important. In general, all roads followed the natural land contour, with as little bridging and cut and fill as possible. A bituminous surfacing material was used in most instances.

After Sundt Construction Company had completed its contracts for the original technical buildings, Robert E. McKee, General Contractor, was awarded the contract for "S" Site, one of the largest construction jobs in this section. Another contract, for a 56 family housing project, using Houston Ready-Cut houses, was awarded to J. E. Morgan and Sons. This completed the original portion of the construction program and it was thought that Project construction crews (Force Account) could carry on all necessary additions. However, the continued growth of the Project made it necessary to negotiate further contracts, which were awarded the Robert E. McKee Company. Construction contracts have been negotiated lump sum contracts, which were modified as further building was required (except in a very few cases, when Purchase Contracts were used).

A construction organization (Force Account) was established on the Post to handle all maintenance and small construction work. This would normally have been accomplished by contractors, but often it was undertaken by the Force Account employees because schedules had to coordinate with the efforts of the operating contractor, requiring work at odd hours, with considerable interruption. It was also believed security could be better maintained with such forces on certain jobs. The Force Account work was divided into new construction, maintenance, and operation.

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Skilled military personnel were utilized as much as possible, but it was necessary to supplement enlisted personnel with civilians, as combat areas required more and more soldiers. There was often a lack of harmony between the military and civilian personnel, and when larger numbers of civilian personnel were available, it became desirable and possible to separate the two groups. After April 1946, the Zia Company took over maintenance work.

It was the policy to utilize all existing housing and utilities, and to construct new buildings or utilities only as necessary, but then as rapidly as possible. Buildings at the Project are of three general classifications: housing for military and civilian personnel; technical buildings; administration and utilities buildings. Generally speaking, the first two classifications are of an economical design and a semi-permanent type. The major portion of them have triple-seal gypsum board for siding. Interiors are sealed with gypsum board or celotex. A small amount of masonry and concrete work is involved in the structures. The original technical buildings were the modified mobilisation type, with exterior of drop siding on gypsum board sheathing. Most of the buildings are reinforced to withstand heavy loading. Other technical buildings have such necessary modifications as complete air conditioning and dust-proof construction, ceilings of acoustical tile, and automatic sprinkler systems. Most of the technical buildings are heated from a central boiler plant. Twenty-five outlying satellite sites have been constructed for experimental work.

Roads, streets and parking areas were of utmost necessity to the community and were constructed as rapidly as possible.

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A generating plant was constructed and enlarged several times, with a tie-in to the New Mexico Power Line. Local distribution is by overhead high tension lines to transformer stations.

Water is obtained from five sources which have been extensively developed in periodic expansions. The addition of three wells in the Rio Grande Valley, with a 1,000,000 gallon storage tank and a temporary pumping system, was in use by the end of 1946; permanent pumps will not be completely installed until August 1947.

Boiler House No. 1 originally provided steam for the Technical Area from two coal burning boilers. Various expansions resulted in the construction of Boiler House No. 2 and the abandonment of Boiler House No. 1. Boiler House No. 2 ultimately contained six oil-fired boilers.

The sewage system consisted of numerous septic tanks and vitrified clay sewer pipes. A large central system was originally considered unnecessary because of the small number of people originally contemplated. It has proved inadequate, however, and a complete new disposal plant, replacing the overloaded system, will be completed in September 1947.

The Forest Service provided the original telephone connection. This was replaced by an Army field wire connection, and in March 1945, lines added by the telephone company had increased the total to eight. Further expansion is in process to install a complete dial system and to service the dormitories and apartment houses with telephones.

A Teletype Machine was installed with coding machine early in 1943. Later, three were used, until 3 November 1945, when only two were in operation.

Early in 1946, plans were initiated to bring a natural gas line into

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the Project. All new housing is on this line and eventually all cooking and heating in standard housing will use this fuel; the natural gas will also be used, in part, for fuel for power.

By reason of the isolation, facilities and terrain, construction problems were unique, and hindered progress to a degree. Construction schedules were maintained only for individual jobs and not for the construction being done by the unit as a whole, largely because the entire program could not be forecast.

The total cost of the Project was \$57,880,000, which includes overhead, engineering, utilities, operation and maintenance.

6. Administration and Operation of Community.- The Military Post Headquarters were directly responsible for the operation and administration of the Post, including security. It was their direct function, until April 1946, to provide and maintain all utilities for civilian and military personnel. After that time these functions were handled on a cost plus fixed fee contract with a newly organized firm, the Zia Company. Because of the lack of housing, personnel turn-over was great and it was difficult to induce artisans to come to the Project. Numerous types of housing were used: dormitories, hutments, barracks, apartments, Master Houses and trailers. Transients were given quarters in Fuller Lodge, Guest Cottage and the Big House (existing stone and log structures of the Los Alamos Ranch School). Rental rates, maintenance quotas of housing facilities and records were administered, for the most part, by a Housing Office under the Army until April 1946, when this duty became one of the Zia Company's responsibilities, but parts of these functions were administered by the Operating Contractor until February 1946. Rents

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for houses and apartments are based on annual incomes and ranged from \$5.00 to \$67.00 per month. Flat monthly charges for dormitories and for utilities were made. Utility rates for other quarters varied according to the type of accommodation. Maid and linen service was provided in the dormitories at a monthly charge of \$2.00 per person. Enlisted personnel were billeted in barracks structures.

Civilians had access to the North Mess, West Mess, Fuller Lodge and East Cafeteria. Military personnel were provided with their own mess halls.

Because the commissary was the sole source of food supplies on the Post, it was necessary to stock more items than normally handled by this type of unit. It was originally intended to serve only residents of the Project, but later all employees were included. Then, on 10 June 1946, the original policy was reinstated and cards were issued to residents of the Post only. Inasmuch as the Operating Contractor's employees could not have bank accounts in Santa Fe, the commissary handled larger sums than were provided for by Army Regulations in order to cash pay checks. The cash sales were \$672.42 in March 1943, compared with \$83,000.00 in March 1946.

The Post Exchange was activated 25 June 1943, to provide extra services, and to sell supplies and sundries not handled by the Commissary. The system included two Post Exchange branches, a service club, a trading post, a beauty shop, a barber shop, a shoe repair shop, a gasoline and repair station, and a dry cleaning plant. The last-named three facilities (the shoe repair shop, the gas station and the cleaning

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plant) were placed under concessionaires' contracts.

About 1 July 1943, the Motor Pool was established, with a repair shop in conjunction. The pool consisted of 45 vehicles, with two WAGs and seven enlisted men assigned as drivers. It has grown to 1180 vehicles, and 116 civilian drivers as of December 1946. The function of this pool is not only to provide transportation for individuals, but to haul materials and maintain passenger bus service. The provision of a Motor Pool is most important because of the isolation of the site and the necessity for security. Much of the equipment was procured from Oak Ridge and was only in fair mechanical condition, requiring frequent repairs. In December 1944, 37 soldier mechanics were assigned to a shop for making these repairs; in April 1946, the staff included 97 civilians and 53 enlisted men. It was difficult to secure parts through Government channels and permission was granted to procure items from local markets; this expedited repairs.

Maintenance and repairs to community buildings were generally done by Force Account according to priority need. For emergency calls, a crew was maintained on a 24-hour basis. Another cleaning and painting crew was provided to refinish vacated apartments. Not all of the buildings contain electric refrigeration, so ice had to be brought to the Project from Santa Fe. The furnace firing areas were divided among seventy janitors who maintain the heating of apartments, dormitories, and duplex units. The ashes were collected and used for fill or for surfacing of low-cost roads. Garbage was collected and disposed of in an incinerator. Six central "help-self" laundries, fully equipped, were provided, at an hourly rental for all residents.

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Col. J. M. Harman was appointed as Accountable Property Officer 1 May 1943, and under his supervision a system of property control was established. The function of supply covered a vast field, and was hampered by lack of personnel, rapid growth of the Project and rigid security measures. The account operated under several directives at different periods of time. No formal audit was made until early in 1946. Procurement was another responsibility of the Accountable Property Officer. It was understood that the Procurement Section of the Operating Contractor would deal only in technical and scientific supplies, but the Post Supply Officer would provide the other necessary items. Procurements of coal and diesel fuel were made through established Quartermaster Depots under Treasury Procurement Schedules.

Civilian guards were assigned to the maintenance of security at the Post until April 1943, when an MP Detachment from Ft. Riley, Kansas, was sent in to assume that responsibility. At first it was thought best to use mounted sentries but that proved impracticable and the plan was abandoned. As the security fences were completed, foot patrols and gate guards acted as sentries. In 1944, the demand for escorts to accompany uncleared workmen in the Technical Area made it necessary to reorganize the guard into two patrols working 24-hour periods alternately. Radio equipped cars were used to aid in guard duty. Military Police have constituted the primary law enforcement officers, under supervision of the Provost Marshal. Law enforcement of a civil nature originally was a matter of community cooperation, with traffic violations handled by the Town Council under voluntary submission to jurisdiction. In July 1946 a U.S. Commissioner's Court was established for this purpose, just outside

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the main gate to the site.

Prior to 1 April 1943, the construction contractor provided fire protection; after that time one fire chief and six firefighters, all civilians, Government employed, reported for duty. These civilians, except the chief, were later replaced by enlisted personnel. The original equipment was one brush firefighting truck, and two pumper fire trucks equipped with 2000 feet of 2½" hose. In addition to their primary function of firefighting, this department has delivered water to the various sites and cleared brush and forest land under the Forest Service Direction. Present firefighting equipment is adequate and up-to-date, and there are over six thousand fire extinguishers in the community buildings as further precaution against fire.

The Operating Contractor made arrangements for the medical care at Los Alamos. Two physicians and three trained nurses were employed to care for the health of all personnel on the Post. A five bed infirmary was provided as a hospital, with provision to use Bruns General Hospital at Santa Fe. This arrangement proved inadequate and a larger installation was completed in 1944. The staff of doctors, nurses, and technicians was also sufficiently increased. Military personnel were cared for in a small infirmary and in Bruns General Hospital. After the Fall of 1944, the infirmary was only used for sick call. Public health functions fell under the jurisdiction of the Army with Project Surgeon acting as advisor.

Originally a dental^{officer} came weekly from Bruns General Hospital to take care of emergency appointments. Later a regular dental office was set up in the hospital under Army dentists. There was a staff of four

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civilian dentists at the end of 1946.

A veterinary department was established in April 1943 under the MP Detachment. The purpose of this service is the inspection of all foods of animal origin, including milk, as well as the care of all animals on the Project. As many as 134 Army horses have been at the Project at one time, in addition to numerous dogs, horses and other animals owned by civilians.

An Intelligence and Security Office began operation in April 1943, with two military members. With the growth of the Project this gradually enlarged to a staff of 115 military and 18 civilian members, in April 1946. A pass system was designed, both simple and effective, to maintain security without interruption of the flow of essential materials and the clearance of construction employees and Project employees. A pass office was established in Santa Fe to expedite admittance of new arrivals. At the Project, guard posts were established and areas were enclosed with mesh-wire fences equipped with alarm devices. All arrangements for incoming active material shipments were handled by the Security Office. Key personnel were protected by armed guards. A system of code numbers and names, to conceal their identity, was also used. Mechanical detectors, highpowered flood lights, and voice amplifiers were added protection in certain technical areas. The Intelligence Section was charged with prevention of dissemination of classified information, and the investigation of all Project personnel both military and civilian. Censorship of all mail was instituted December 1943 and discontinued shortly after the cessation of hostilities. For the same purpose, limited monitoring of long distance telephone calls was conducted and all incoming and

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outgoing telegrams and teletypes were reviewed.

The relationships held by the Project with the organizations of the State of New Mexico, were extremely cordial. Since utmost secrecy had to be maintained, employees' names and other information could not be divulged and many unusual requests had to be made in obtaining licenses, in payment of State income tax, and in rationing. An attempt was made to permit Project residents to vote locally in the 1944 Presidential election, but was unsuccessful because the site was a Federal Reservation.

The Catholic Church of Santa Fe first arranged religious services at the Project by sending a priest every Sunday to conduct masses. The Ministerial Association of Santa Fe began sending Protestant clergymen, but their services were scheduled on short notice and during irregular hours; finally a regular Army Chaplain was brought in to establish Sunday Schools, regular hours of worship, and hours of consultation. In addition to these religious functions, he initiated many community activities, and held lectures and U.S. Armed Forces Institute courses. Organized recreation grew under his guidance also, until it was placed under a Recreational Director, and under Army Special Services.

Congressional inquiries sought information pertaining to alleged destruction of serviceable government property and discrimination in the housing of employees of Spanish ancestry. Both were carefully investigated and proved to be without foundation. Numerous inquiries from Congressional Representatives have been received regarding the discharge of soldiers.

In August 1943 an advisory council of six resident members was

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chosen by the Commanding Officer and the Laboratory Director, to serve for six months, and thereafter to be selected by election. This Town Council has continued to function as a liaison between the community and the administration with reference to community problems and complaints.

The Santa Fe Area Engineer of the Albuquerque District personally recruited and interviewed all key personnel for the service installation, most of whom had previous excellent records with the War Department. Civil Service employees were used wherever possible. There were 1700 Civil Service employees in March 1945 and this reached a peak of approximately 2600 in March 1946. The Manpower Commission filled large requisitions for hourly skilled and unskilled personnel, even recruiting from other states. The Project did not discriminate between union and non-union employees, as security reasons prevented the establishment of a "closed shop". There was an exceedingly high turn-over of personnel, largely because of inadequate housing facilities. In addition, absenteeism ran into large figures for reasons which included the long commuting distances and the religious ceremonies which the Spanish and Indians attended.

A Safety Committee handled safety problems until March 1945 when a Safety Division was organized. The Manhattan Engineer District was presented with the National Safety Council's Award of Honor on the basis of the low accident frequency ratio of all the Projects, including Project "Y".

War Department stores and commissaries were exempt from OPA retail regulations, and, therefore, the OPA prices were not enforced in the Project area. Most goods were sold considerably under the ceiling level,

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however. Milk was the only item above the Santa Fe ceiling level. This was the result of several factors. Only one supplier met the sanitary standards in an adequate quantity. The difference in price could readily be attributed to the difference in butter fat and adherence to purity standards.

There has been a constant growth of the school since its establishment in 1943, when 140 children were enrolled, until 1946, when the student body was more than 350. Buildings and equipment have been added to accommodate this increase in school population. Teachers' salaries are adequate and a good faculty is the result. A doctor and nurse are assigned to the school to maintain high standards of health. For children of two to five, a nursery school is provided, which especially benefits mothers employed on the Site.

All funds accrued to the Government from the Project were originally forwarded to the Finance Officer for deposit to the United States Treasurer. In February 1944 this was changed and monies collected were forwarded to the Contracting Officer for credit against the contract cost. In the Fall of 1946, this procedure was again altered to transmit these credits to Zia Company.

The only claims ever made against the Government at the Project were small ones resulting from traffic accidents or from blast effects and were settled in a routine manner. Other claims were settled by the Operating Contractor (such as damage to Frijoles Lodge).

Legal counsel was available for civilian and military personnel through the Legal Section under the supervision of Captain Ralph Carlisle Smith who was also Patent Advisor.

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Workmen's Compensation and U.S. Compensation covered employees for service-incurred injuries. After the Zia Company had been awarded the maintenance contract, they provided their own insurance, with the U.S. Fidelity and Guaranty Company. There is an unofficial Hospitalization Plan at the Project whereby employees may have monthly deductions made from their salaries, payable to the Business Men's Association for certain hospital benefits.

7. Organization and Personnel. - The Army was to act in a service capacity, and Lt. Colonel J. M. Harman, (later promoted to Colonel), Commanding Officer, and his staff arrived to set up the necessary organization. When the Commanding Officer moved from Santa Fe to Los Alamos 19 April 1943, the Post Headquarters was established. Key civilians were placed as section chiefs, and Civil Service employees were added to the roster until a maximum of 2500 was reached early in 1946. Three troop units were originally assigned including a WAC Detachment. A fourth detachment of special Engineers was later added. These four detachments were service organizations and maintained all utilities as well as functioning in specialist fields. They proved invaluable in their ability and varied qualifications. Special arrangements with the service command were necessary in the matter of transfers for security reasons.

Lt. Col. J. H. Dudley of the Manhattan District was responsible for the investigation of the Site. He was aided by Col. L. Rosenberg and Col. R. E. Cole of the U.S. Engineer Office in Albuquerque and Captain William D. Welch and Captain Floyd Snyder of the Real Estate Sub-office of the Southwestern Division, also in Albuquerque.

Officers were carefully screened before being assigned to the

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Project. There were some transfers and reassignments for various reasons.

Some friction developed between the Technical Area civilians and the civilian and military workers in the Post Administration. This was based on resentments which grew from misunderstanding, differences of administration and regulations, as well as the irksome restrictions imposed by security. After the news of Hiroshima made public the importance of the work done at Los Alamos, morale was decidedly better.

The officers who investigated the site also transacted the arrangements for the acquisition of site land; this was efficient as they were familiar with the situation.

Multiple duties were assigned the officers as the staff remained small the first two years. Consequently it was difficult to separate the organization into the usual categories of an Army installation. The Operations Officer was responsible for design, engineering, maintenance and repair. The Post Engineer was a member of his staff and followed the construction, maintenance and repair work.

The Post Engineer supervised the Provisional Engineer Detachment as well as foremen and crews of various trades. The Operating Contractor employed personnel for the repair and maintenance work in the Technical Group until January 1944 when two Post Engineer organizations were formed. One had charge of the Post, the other supervised the work of the Technical and outlying sites.

The organization was consolidated in January 1945, giving complete supervision to the Operations Officer.

The Post Engineering Officer was responsible for preliminary

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planning, alterations, and revisions. But inasmuch as most of the designing and engineering was done by W. C. Kruger under contract, it was not necessary to have a large engineering organization at the Post.

Construction, too, was largely handled by contractors. Still it was necessary to set up a Government Force Account organization to maintain facilities and perform some new construction or revision of existing structures.

No official census was taken until April 1946, but a compilation of payroll figures with an estimated dependency population shows an approximate total of 3500 at the end of 1943; in December 1944 it had reached 5675. The end of 1945 showed an approximate population of 8200. And as of the end of 1946 there was an estimated total of 10,000 at Los Alamos.

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MANHATTAN DISTRICT HISTORY

"Y" PROJECT

SECTION 1 - GENERAL

1-1. Purpose. - By October of 1942 it had become increasingly evident, from the progress of experimental developments under the supervision of the Manhattan Engineer District at its other installations, that the immediate establishment of an additional research site was necessary for the solution of specific problems relating to the production of a nuclear weapon. The purpose of this new installation was the developing, final processing, assembly, and testing of the weapon under development - the atomic bomb. The contemplated scope of this part of the Manhattan Project was of sufficient magnitude to justify a separate title; accordingly it was named Project "Y".

1-2. Administration. - After determination of the site, Lt. Col. (later Colonel) J. M. Harman was designated as the Commanding Officer. The University of California had been selected previously as Contractor for administration of the technical work.

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SECTION 2 - SITE SELECTION

2-1. Requirements. - Inasmuch as the new Project was to be the most secret of the entire Manhattan Engineer District program, isolation was perhaps the first requisite for the site. However, many other factors had to be considered:

- a. The area had to be large enough to provide an adequate testing ground.
- b. The climate had to be such that outdoor work could continue through the winter months.
- c. Access by roads and railroad was necessary for movement in personnel and material.
- d. The source of construction materials had to be near enough to keep costs reasonably low.
- e. The population within 100 miles radius of the site had to be sparse to maintain safety and security.
- f. Utility facilities, including power, water and fuel supply had to be available or conveniently developable.
- g. Housing facilities had to be present to quarter the first personnel at least.
- h. The ownership and estimated value of land and speed of acquisition had to be considered.
- i. Soil characteristics, timber density, and type of terrain also had to be carefully investigated as the basis for future construction.
- j. Besides isolation, it was also necessary to find a

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location remote from all sea coasts, as the possibility of attack still had to be considered.

The U.S. Engineer Office and Real Estate Sub-office in Albuquerque surveyed the several areas in New Mexico which were considered for this site with these requirements as guidance. Their reports show the emphasis which was placed upon all of these points.

2-2. Sites Considered. - Original site surveys were made at Gallup, Las Vegas, and La Ventana as well as at Jemez Springs, and Otowi, New Mexico. But after careful investigation the first three locations were rejected, as each failed in some way to satisfy the requirements established. After these three were abandoned, more detailed reports were made for Jemez Springs and Otowi.

2-3. Selection. - A preliminary Real Estate report for the possibility of the site to be located at Jemez Springs was made by the Southwestern Division Real Estate Branch 12 November 1942 (Appendix F-1). All pertinent factors were considered in the report, such as water supply, housing facilities, access by road and railroad, ownership and estimated value. An additional report, dated 13 November 1942 (Appendix F-2), was made by the U.S. Engineer Office, Albuquerque, New Mexico, covering in more detail, the buildings around Jemez Springs which could be used for housing, together with a report on the sources and costs of construction materials, climate, labor supply, recreational facilities, population within a hundred mile radius, fuel supply, medical facilities, and the steps necessary to acquire the land for the proposed site. Had Jemez Springs been selected, 70 percent of the housing would have had to be constructed for the immediate needs of

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the Project. No recommendations were made in this report inasmuch the specific purpose of the site was unknown to the office making the survey.

On 17 November 1942, the Manhattan District authorized the Albuquerque Engineer District to conduct a site investigation in the vicinity of the Los Alamos Ranch School, Otowi, New Mexico. This survey was supervised by Lt. Col. W. H. Dudley, CE, of the Manhattan District, and members of the U.S. Engineer Office of the Albuquerque District. Reports comparable to those submitted on the proposed Jemez Springs site, were prepared by the Southwestern Division Real Estate Branch on 21 November 1942 (Appendix F-3), and the U.S. Engineer Office, Albuquerque District, on 23 November 1942 (Appendix F-4). The fact that the existing Los Alamos Ranch School buildings could be utilized for immediate housing was a factor in the recommendation of site. In addition, Otowi had greater accessibility, a better water lower valuation, and lay in a more sparsely populated area than Jemez Springs. All of these advantages were summed up in the recommendation by Lt. Col. Dudley with the following favorable points:

- a. The major part of the area (some 46,667 acres of the estimated 54,000 acres required) was easily obtained for use inasmuch it was government owned.
- b. The private land was mainly used for grazing, hence purchase cost was small.
- c. Sufficient area was available to ensure satisfactory spacing of the Project units for safety reasons.
- d. The nearest town was some 16 miles away, which tends

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to isolate the site from a security standpoint.

e. The area proper was located on a mesa, making the entrance thereto easy to control from a security standpoint.

f. The main site was located in an area relatively free from timber, which meant little clearing was necessary.

Representatives of the Manhattan District, Albuquerque District Office, and the Southwestern Division Real Estate Branch met on November 1942, at the Los Alamos Ranch School, to consider that location in detail and to discuss matters of conversion. The choice of the site was also discussed with Dr. J. R. Oppenheimer, Project Director, and members of his staff, for further confirmation as to the desirability of the location. After careful consideration of all the cumulative reports, General L. R. Groves determined that Project "Y" would be centered at the site of the Los Alamos Ranch School, Otowi, New Mexico.

2-4. Description

a. General Location of Site. - Los Alamos is located in a sparsely populated rural area on the east slope of the Jemez Mountains (part of the Rocky Mountain System), in Sandoval County in the north central part of New Mexico. The project is about twenty miles, air-line distance, northwest of Santa Fe, New Mexico, the state capital. Santa Fe is the nearest railhead for the project and is the terminus of a branch line of the A.T.&S.F. Railway which joins the main line of that railway at Lamy, New Mexico, eighteen miles south of Santa Fe.

b. Access Roads. - Access to the Project is available via two alternate routes extending westward from paved, primary highway No. 285 which runs northwestward from Santa Fe through Espanola, New Mexico.

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(1) The shorter route is via State Highway No. 4 leaves the primary highway at Pojoaque and crosses the Rio Grande R the Otowi Bridge. This is a secondary, unsurfaced road located along an unimproved alignment from Pojoaque to the juncture of State Road No. 4 and State Road No. 5, approximately one mile west of Otowi Bridge. A portion of the road varies from sixteen to twenty feet in width; in places the right-of-way is limited by community building structures located along the highway. The use of this road by unusually heavy long motor vehicles is precluded by the Otowi Bridge, which is a six lane suspension bridge of 250 feet span, 10 feet in width, and designed for 10 ton loading, with its east approach in a narrow side hill cut requiring a turn of approximately 90° on to the bridge. (Appendix E) Also the route is so rough and curved as to cause damage to vehicles frequently traveled. Construction was started in May 1946 to realign and surface a parallel road. During periods of high water this road is closed to traffic by two unstabilized stream crossings; hence a long alternate route via State Road No. 5 and Espanola must be used. The distance from the Plaza in Santa Fe to the Technical Area at Los Alamos via this shorter route is about thirty-five miles.

(2) State Road No. 5 has considerably better alignment and surface than the unimproved portion of State Road No. 4, but travel over this route is also subject to interruptions by high water because of several dips which pass flood waters across the highway. Such interruptions are not so frequent nor of so long duration as on the shorter route. It is 45 miles from the Santa Fe Plaza to the Los Alamos Technical Area via this longer route.

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(3) From the juncture of State Roads 4 and 5 to the Project, the road was originally of irregular surface and poor alignment. The New Mexico State Highway Department, under the supervision of the State Roads Administration, constructed a first class highway over this portion of the access road. The construction was performed under contract with Lowdermilk Brothers Construction Company of Denver, Colorado. Construction was begun early in September 1943, and completed in December 1943. The work consisted of grading, building drainage structures and applying a base course surfacing which was wetted and compacted with a roller. During the summer of 1944 the entrance highway was surfaced with a 1/2 inch bituminous mat and a double asphalt surface treatment. This work was also done by the State Highway Department. (Appendices E-5 through E-8.)

(4) A third access road exists from the west gate of the Project via Valle Grande to Albuquerque (approximately 110 miles). This route is unimproved, very rough and closed by snow during winter months. Consequently it is not frequently used.

e. General Topography. - Approximately two-thirds of the reservation occupies a relatively flat, east sloping bench land at elevations ranging from 6900 feet to 8200 feet above mean sea level, and lying between the valley of the Rio Grande and the east slope of the Jemez Mountains. The western third of the reservation includes the rising east slopes of the Jemez Mountains to elevations ranging from 8000 to 9000 feet above mean sea level. The entire area is frequently dissected by east-flowing drainage and the streams have cut innumerable deep canyons ranging from 100 to 500 feet in depth, separated by mesa

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of varying extent. The canyon bottoms, in general, are narrow and rimmed by precipitous cliffs having a vertical height of 50 to 200. Many of the canyons are box type from which there is no access out the mesa on either side.

d. Structures. - Two properties, namely the Los Alamos Ranch School and Anchor Ranch, had structures of value as housing and storage. The School comprised fifty-four buildings: Twenty-seven houses, dormitories and living quarters with a total of 46,626 square feet, and twenty-seven miscellaneous buildings, namely: a public school (operated by the State for the children of employees of the Ranch School), an arts and crafts building, carpenter shop, a small saw mill, implement barn, saddle barn, hog barns, stables, sheds, garages, and ice house totaling approximately 29,560 square feet. Some of these buildings were remodeled into housing and stores while some were entirely removed. There were four houses at Anchor Ranch Site, with approximately twenty rooms, and a small barn.

e. Nomenclature. - Because the name Los Alamos was considered as classified information, the installation was variously identified by Manhattan Project workers as Site "Y", Project "Y", Zia Project, Santa Fe, Area "L", Shangri La, Happy Valley, and the like. However, the residents of Los Alamos and Santa Fe simply referred to "The Hill" when discussing Los Alamos.

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SECTION 3 - LAND ACQUISITION

3-1. Procedures. - On 25 November 1942, the Under Secretary War directed acquisition of the land recommended by letter of 25 November 1942 from the Chief of Engineers to the Commanding General, Services Supply (Appendix D-1). The necessary procedures were then instituted for acquiring this land for immediate use, the method depending on ownership.

a. Federally Owned Land. - In a letter dated 22 March 1943, the Secretary of War requested that the Secretary of Agriculture grant authority for the War Department to occupy and use, for as long as the military necessity exists, 45,100 acres of federally owned lands under the jurisdiction of the Forest Service (Appendix D-2). This authority was granted by the Secretary of Agriculture on 8 April 1943 (Appendix D-3). Arrangements were to be made between the Commanding Officer of the Los Alamos Project and the Regional Forester at Albuquerque, New Mexico, for the prevention and suppression of fires, the management and protection of the area, and the marking of areas within which outsiders may be permitted (Appendix F-5). In addition to the authority granted by the Secretary of Agriculture, it was necessary to withdraw grazing permits authorized by the Forest Service. This was accomplished by direct negotiation between the Real Estate Sub-office and the grazing permit operators, whereby payment was made on the basis of \$20-\$30 for each head of stock allowed under the grazing permits.

b. Privately Owned Land. - The process prescribed for acquiring privately owned land was by condemnation or purchase. Authority

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for condemnation of private lands needed is contained in the 2nd War Powers Act. Under this Act, the government filed a petition in Condemnation which resulted in an Order of Possession served by the court on the land owner who then had to vacate so that the government could occupy. To acquire the land permanently a Declaration of Taking is made by the government and appraisals are made by an appointed commission. If the appraisal is not approved by both the land owner and government, the case is then settled in the U.S. District Court.

3-2. History of Acquisition. - The land was acquired in five separate areas, "A", "B", "C", "D", and "E", shown originally on a drawing, No. LA-NM-10/6, dated 27 August 1943 (See Appendix A-3 for boundaries of these areas). In acquiring these areas under Real Estate Directive RE-D 1958 dated 25 November 1942, it was necessary to acquire all the tracts in fee simple through the filing of Declaration of Taking proceedings. This action was necessary because there was not sufficient time to conduct negotiations with each owner, and further because condemnation proceedings would still have been necessary to eliminate the numerous title defects which existed. The twenty grazing permits were secured by direct negotiation. Subsequently the Commanding Officer of the Los Alamos Project requested that the grazing rights be eliminated from all of the area "E" and that acquisition of the privately owned tracts be accomplished, primarily to acquire water and water shed rights. Appendices D-4, D-5, D-6, D-7, D-8, show schedules for the various areas with the perimeter descriptions, and the names and addresses of the owners. The filing of Petitions in Condemnation under the Second War Powers Act was made for Area "A" on 10 May 1943, for Areas "B" and "C"

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on 18 June 1943, for Area "D" on 12 August 1943, and for area "E" on December 1943. Priority and rate of acquiring the areas were determined by the Commanding Officer through the Southwestern Division Real Estate Sub-Office. The Petitions in Condemnation were worded to cover all mineral, special use, water and timber permits, and all other interests whatever nature, so that the private individuals would have no reason whatsoever to enter the areas. The land is held according to the following breakdown: by permit from other government agencies, 45,737 acres; War Department ownership, 3,600 acres; by lease, 40 acres (returned 17 October 1943); and by easement, 6 acres (Appendix A-2). This includes the right of way for a power line to the Project from the Bernalillo-Santa Fe line of the New Mexico Power Company (Appendices A-3, A-4 and

3-3. Appraisals. - The appraisal covering the Los Alamos High School was made by Major Gerald T. Hart, Office, Division Engineer, Dallas, Texas, and Mr. Watson Bowes of Denver, Colorado, a member of the American Institute of Real Estate Appraisers. All other appraisals were made through direction of the Real Estate Sub-Office, Albuquerque, New Mexico. All factors affecting market value were considered by the appraisers, including desirability, physical characteristics, location, soil type, topography, and other factors. Prices at which similar land was sold between the individuals located in the immediate area were the main criteria used in establishing values.

3-4. Condemnation Proceedings. - Of the twenty-two tracts in areas "A", "B", "C", and "D" that were condemned and for which Declarations of Taking proceedings were filed, sixteen stipulations were secured to acquire title in fee simple, indicating that the prices offered were

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satisfactory. The principal objectors to the prices offered by the Government were Mr. Elfege Gomes of Espanola, New Mexico, and Mr. Ma Lujan, of Santa Fe, New Mexico. Of the thirteen privately owned tra in area "E", six were acquired by direct negotiations and seven were condemned under the Declaration of Taking Act because of price contr or title defects. The principal objectors to the amount offered were Elfege Gomes, and Ernesto and Adolfo Montoyo of Espanola, New Mexico.

3-5. Problems and Difficulties. - All Condemnation and legal regarding government possession of the private lands and the satisfy claims against the public land were handled by the Southwestern Divis Real Estate Sub-Office, in Albuquerque, New Mexico. Other than those in condemnation proceedings no special problems were encountered. He ever, a portion of the Los Alamos Project is bordered by the Bandellis National Monument and also an Indian Sacred Burial Ground, which cause irregularity in the Project boundary in the Southeast portion.

3-6. Progress. - The right of entry to the Los Alamos Ranch S granted by Mr. A. J. Connell, President and Director, on 23 November to construct, survey and explore on the lands and property of the Sch greatly facilitated the early beginning of construction. This property then acquired by direct negotiation. All other areas were acquired w needed by the Project on the request of the Commanding Officer to the Estate Sub-Office. Inasmuch as acquiring the right to use and occupy land was a quick process, no hindrance to the Project was encountered though transfer of title required the usual lapse of time for processi Exclusive federal jurisdiction of all land in New Mexico acquired by t United States for military purposes was accepted by the Secretary of W

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in letters to the Governor of New Mexico dated 8 August 1944 and 24 May 1945 in accordance with New Mexico Statutes. These lands included a material portion of Los Alamos Reservation, particularly the land acquired from the Los Alamos Ranch School, Anchor Ranch and certain individuals. In addition, in the letter of 8 August 1944, the Secretary of War accepted exclusive jurisdiction over all lands reserved from the public domain for military purposes. However, in a letter of 7 September 1944, the Secretary of War wrote to the Governor of New Mexico stating inter alia that since the laws of the State of New Mexico do not cede exclusive jurisdiction over land reserved from the public domain for military purposes (except two specific installations not involved in the Los Alamos Project), it was not intended to include in the list of lands over which exclusive jurisdiction was accepted such lands reserved from the public domain. The letter of 24 May 1945 from the Secretary of War omitted reference to lands reserved from the public domain. Consequently since such public domain lands were taken for the Los Alamos Reservation, there is some question as to the extent of exclusive jurisdiction of the U.S. Government on the Los Alamos Reservation. (Appendices D-9, D-10, and D-11).

3-7. Classification of Land. - The original amount of land estimated to be required was 54,000 acres. This was later decreased to 49,382.665 acres. Some 45,667 acres (of the 45,736.533 acres of Government land) were obtained for use from the Secretary of Agriculture (initially estimated as 45,100 acres), the remainder being acquired for the power line right of way in the following manner and quantities: from the Department of Interior, Grazing Service, 46.513 acres; from the Department of Agriculture, Soil Conservation Service, 3.520 acres; from the Department

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of Interior, Indian Service, 19.5 acres. All of the above lands were obtained for use from the Secretary of the department concerned. The War Department has acquired ownership of 3,599.7 acres. Forty acres surrounding and including Frijoles Lodge were leased on 19 June 1943 for use as additional housing. It was terminated 17 October 1943 but used again 17 July to 5 August 1944 during the peak housing shortage period. The power line right of way also crossed private land and New Mexico state land, so easements were secured for 1.242 acres in the former case and 5.190 acres in the latter.

3-8. Costs. - The total cost for all lands acquired in fee simple, lands acquired by easements, lease and in any other manner was \$414,971.00. The cost of the school, with buildings, appurtenances, and 470 acres was \$350,000.00; Anchor Ranch, with 322.16 acres, was another high contributor to cost, with a selling price of \$25,000.00.

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SECTION 4 - DESIGN AND ENGINEERING

4-1. General. - Design and engineering, through 15 March 1944, were under the supervision of the Albuquerque Engineer District of the Southwestern Engineer Division. After this date supervision was assumed by the Manhattan Engineer District. Inasmuch as the design and engineering in the technical field were largely dependent upon the development of research and experimental processes, actual needs and requirements continually demanded major or minor alterations. The firm of W. C. Kruger was selected by the Albuquerque District as Architect-Engineer for initial design and engineering; this firm continued its work for the Manhattan District after the supervision was transferred to that office. R. O. Ruble was the Engineer, and R. W. Graef was the Supervisory Architect for the firm. In December 1945 Black^{and} Veatch were also engaged as Consulting Engineers in all utility designing and engineering.

4-2. Contracts. - A contract for the design of the originally authorized buildings and utilities was negotiated by the Albuquerque District with W. C. Kruger Company. This firm was selected because they maintained a competent architectural and engineering staff and had done considerable satisfactory work for the District. In addition, this firm's office was located in Santa Fe and was in a good position to collaborate with the Operating Contractor, regarding special technical items which they desired to be incorporated but which were not ordinarily covered in standard Army construction. The original contract for the architect-engineer services was for providing plans for the rehabilitation necessary to adapt existing buildings for the use required, and to provide plans for

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new buildings. The original directive covered the rehabilitation of thirty-one buildings and the drawing of plans or adapting Standard War Department Construction Plans for 111 buildings, together with planning of utilities and streets. This new construction was to provide housing and other facilities required for military personnel, apartment houses and dormitories for technical personnel, power plant, administration buildings, dispensary, school, Post Exchange, commissary, theatres and technical buildings. As the Project expanded the amount of work required of W. C. Kruger, Architect, increased⁵ in proportion. (Appendix D-12.)

4-3. Procedure. - The normal method of determining the requirements for the unit to be designed, in the case of technical area structures, was for the Operating Contractor to sketch the floor plan necessary, list utilities and other major fixtures; then to submit these data to the local Engineering Division, which contacted the Contractor and outlined the job for the design and engineering. The completed drawings were checked for accuracy and standard practice engineering, altered if necessary, and submitted by the Engineering Division to the Operating Contractor for final approval. In the case of structures which were not of technical nature the requirements were transmitted to the Architect-Engineer directly by the Project. In all cases the Architect-Engineer representatives worked directly with the originator of the requirements, if details furnished were incomplete or inaccurate. In addition, a small engineering organization was maintained by the Project Headquarters for the design and engineering of small tasks of a simple nature for which outside contracts were not considered justified or desirable.

4-4. Description of Design and Construction Processes. - All

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design and engineering contracts were awarded to the one firm, W. C. Kruger Company, Architect-Engineer, in order to minimize delay which normally accompanies emergency work. In many cases actual floor plan construction was in process prior to completion of super-structure drawings. The process by which contracts were awarded or extended was to outline the work required to the firm; receive their cost estimate; review it in comparison with costs of similar jobs previously completed, or in progress; then negotiate with the Contractor in cases of differences. Some contracts were renegotiated where it appeared that an excessive profit had been made. Profit was figured by the Local Engineer Division upon the Corps of Engineer standards, with controlling factors of payroll costs, overhead, current material costs, etc. as a basis of accounting. Wherever excessive profits were made, the contractor returned the established overage to the Government. Five contracts were thus renegotiated, with the following results:

<u>Contract No.</u>	<u>Contractor</u>	<u>Amount Refunded</u>
W-7425-ENG-55	McKee	\$46,183.47
W-7425-ENG-72	"	32,067.51
W-17-028-ENG-3	"	55,588.17
W-17-028-ENG-1	"	113,094.41
W-17-028-ENG-13	"	<u>392,770.86</u>
		\$639,704.42

(The payments on these contracts shown in App. D-12 are net, with these refunds deducted as credits.)

4-5. Costs. - Fees for the Architect-Engineering work were arrived

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at through negotiations with the chosen Architect, and on the first job, the firm worked its men for the Government on an hourly basis. Additional contracts were negotiated under which the firm would prepare plans for new construction, provide survey and layout crews, and do a small amount of inspection to coordinate with the inspection done by the Engineering Division concerned. A lump sum price was negotiated for each item of work done, and a check of the lump sum amounts revealed that in no case did the cost of Architect Engineering services exceed $3\frac{1}{2}$ percent of the cost of the construction item; the average fee being between 2.8 and 2.9 percent. Monies paid to W. C. Kruger, Architect-Engineer, were \$174,968.98 by the Albuquerque District, and \$568,737.70 to 31 December 1946 by the Manhattan District, totaling \$743,706.68 to that date. Incidentally, the name of the firm W. C. Kruger, Architect-Engineer, was changed to W. C. Kruger Company, Architect-Engineer, early in 1946. The sum paid to Black and Veatch through 31 December 1946 was \$164,116.00.

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SECTION 5 - CONSTRUCTION

5-1. General. - All construction through 15 March 1944 was under the supervision of the Albuquerque Engineer District, except the work covered by Contract W-7425-ENG-15 which was handled by the Manhattan District prior to that date. After that date supervision was transferred to the Manhattan Engineer District (Project "Y" Headquarters). (Appendix D-12, shows major contracts negotiated by each office.) During the period of original construction, in an effort to expedite the work on the new buildings, the Operating Contractor (University of California) employed construction workers independently, under their own supervision of c maintenance (Mr. Brazier) (See Bk. VIII, Vol. 2, pp. III-47ff).

The cost of construction work accomplished under the Albuquerque District amounted to about \$9,300,000. The cost of construction under Manhattan Engineer District, including utilities and hired labor amounted to about \$30,400,000. These figures do not include services of the Assistant Engineer, which were given in paragraph 4-5. Contracts were usually negotiated lump sum contracts (LSC) or purchase contracts (PC) at a stipulated lump sum. They were awarded only to reputable firms, either with or without competition. As has been mentioned before, speed of construction was the most essential factor and contracts were awarded to firms considered most capable of carrying out the terms of their agreements. Construction progressed as well as could be expected from the various unusual difficulties peculiar to this Project. These factors are considered at greater length in Paragraph 5-5.

5-2. Contracts.

a. Selection of Contractors.

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(1) The responsibility of the original selection of construction contractor was left primarily to the District Engineer, Albuquerque Engineer District, who initially supervised construction. This selection was subject to approval by the Manhattan District, in that provisions regarding security might be taken into account. To determine which construction contractor would be best for this particular job, the Albuquerque District considered from a construction schedule point all contractors in this region with sufficient capital, persons and equipment to accomplish the work within the time required. In the process of elimination the District decided that the M. M. Sundt Construction Company would be available to do the work in the time required and was suitable for this type of work. After this firm was selected negotiations were begun, based upon a Government estimate, and, in December 1942, the M. M. Sundt Construction Company was awarded the contract. The company owned and operated a large number of trucks, which made them desirable as a contractor on this particular Project, inasmuch as material had to be hauled from Santa Fe to the job site. They did not use subcontractors in accomplishing the work but had their own plumbing, electrical and painting departments, and, as a result, were the major contractors on the Project during initial construction. This type of organization was desirable from a security standpoint as it was easier to exercise control over its personnel.

(2) Selection of other contractors to do road work, erect tanks, and perform other construction work was made from the same primary criteria as governed the selection of the prime construction contractor. A. O. Peabody, of Santa Fe, New Mexico, was awarded the contract.

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for surfacing roads and streets within the Project because he was a competent contractor, with sufficient capital and equipment to prosecute the work to completion within the time allotted. The contract was negotiated using a Government estimate based on past experience of the Albuquerque District, and called for the construction of streets and within the Project area, including construction of eight miles of roads in the area then known as the Anchor Ranch Range. Roads and streets were of extreme importance to the Project because of the dangerous and delicate materials to be transported. Therefore, every effort was made to construct satisfactory all-weather roads, discussed later. The fact that the first road was constructed and surfaced in the early part of the program, contributed to a large degree in lowering the cost of constructing the project by facilitating transportation of men and materials.

(3) A contract was awarded Lowdermilk Brothers, Co. of Colorado, to furnish necessary quantities of gravel for surfacing site roads, and Post parking areas.

(4) In October 1943, a lump sum contract with the Tank Company of Wichita, Kansas, was negotiated by the Albuquerque District for the construction of two 150,000 gallon redwood water storage tanks (Appendix E-2); the contract was later modified to include rejointing and resetting one 300,000 gallon redwood tank. A 250,000 gallon elevated wooden storage tank (Appendix E-3) was erected by Sundt Construction Company to provide required water pressure through the distribution system. For this tank there was substituted a million gallon steel tank late in 1946 (Appendix E-4).

(5) The original technical buildings constructed by

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M. M. Sundt were T, U, V, W, X, Y, Z, J, M, S and Boiler House No. 2 (Appendix D-15). Building T was the original headquarters of the Operating Contractor, and included substantially all phases of the contractor's work except the laboratory functions and the shop and storeroom. The laboratory equipment, stock and shops were housed in the buildings mentioned. Later buildings A, B and C were added by Sundt Construction Company. Building A then became the Administration Headquarters, Building B provided additional laboratory, office and conference space, while Building C was added as another shop. Sundt also constructed building D and Q. In addition to the construction by Sundt, buildings E and O were constructed by Force Account in 1943, as well as modifications to building K, an original Ranch School building.

(6) After M. M. Sundt Construction Company completed their contract on 30 November 1943, and moved their personnel and equipment from the Project, it became evident that more work would be required, sufficient magnitude to demand a construction contractor. Preliminary requirements for "S" Site (one of the satellite sites described herein) were outlined by the Operating Contractor. However, before a construction directive was issued to the Albuquerque District, W. C. Kruger Company worked with the Operating Contractor in accomplishing the preliminary design. After a directive was issued, the Albuquerque District entered into a contract with the Architect-Engineer for the completion of the design of building and utility layouts, and the furnishing of a survey party for the layout and quantity surveys. Robert E. McKee, General Contractor, El Paso, was engaged to perform the work at "S" Site under negotiated lump sum contracts. This construction contracting firm was one of the largest

this section of the country, having constructed many important projects since the beginning of the war. It was selected for this reason and because of its strong financial position, adequate equipment and personnel. Robert E. McKee had sub-contractors for the electrical, plumbing, painting, roofing, insulating, sprinkler (fire control) installations and the spark proof flooring installations.

(7) During the construction of "S" Site, the Operating Contractor made a request, which was approved, for a two-story building 30' x 100', ("P" Building), and an overhead covered passage connecting with the overhead covered passage between buildings "A" and "T", originally constructed by M. M. Sundt Construction Company. This work was done under the supervision of the Albuquerque District. Competitive bids for this building were taken from J. E. Morgan and Sons, Contractors, and from R. E. McKee, General Contractor, both of El Paso, Texas, and were opened by the Commanding Officer, Project Y, on 1 March 1944. Robert McKee was low bidder and was awarded the contract for construction of this building.

(8) A directive by the Albuquerque District as of January 1944, authorized the construction of housing, for 56 families consisting of eight prefabricated 1-bedroom duplex units, fifteen prefabricated 2-bedroom duplex units, together with the necessary utilities, including water, sewer, and electrical distribution systems, and the necessary construction. This work was accomplished under the supervision of the Albuquerque District, with Architect-Engineer service by Kruger of Santa Fe, using as a basis a schematic floor plan furnished by the Operating Contractor. Bids were received from three prefabricating manufacturers

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after an analysis of the proposals it was decided that the unit furnished by the Houston Ready-Cut House Company, Houston, Texas, most nearly met the requirements of the Operating Contractor. The firm of J. E. Morgan & Sons, El Paso, Texas, being a reputable contractor and having performed previous satisfactory work under the supervision of the Albuquerque District, was selected by the District to execute the erection of the buildings and construction of utilities. The negotiated lump sum contract was awarded on a basis of unit prices as determined from previous similar construction under the supervision of the Albuquerque District. Upon the completion of the housing units by J. E. Morgan and Sons, and of Building and "S" Site by R. E. McKee, the Albuquerque District was relieved in March 1944, of further supervision of construction at this Project and was replaced by the Manhattan District. This step was taken because at that time it was thought that the major part of the construction program was finished and that in order to meet the needs of the Operating Contractor for considerable remodeling, small additions, and shop work, it would be necessary to maintain a number of Project construction crews (Force A see par. 5-3). The plan was to have these crews do all construction work at the Project. Inasmuch as the whole program was not outlined once, and its continued growth not anticipated, it was felt that these crews could accomplish all additional construction required. However, shortly after the completion of "S" Site, it became evident that the work being planned by the Operating Contractor was much more than could be accomplished without a construction contractor for the large tasks. Construction planned, after the Manhattan District assumed supervision of the work, was awarded to the Robert E. McKee organization by negotiated

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lump sum contracts, using unit prices determined from past contract records and from comparison with Project construction crew costs. Because of the urgency of the construction and the haste with which a considerable part of it had to be completed, work at times was started before complete plans for the entire development were available; for that reason, payment for the work was started before a price for the entire amount was agreed. The price negotiated for work already started was considered fair by both parties. In fact at no time was it found that the contractor tried to obtain excessive prices for work performed. In a number of cases, by comparison with work substantially the same as those constructed by the M. M. Sundt Construction Company under the original contract were required and, in such cases, a comparison between the price of the original contract and the price of the Robert E. McKee organization was made. In most cases, the prices of the latter were found to be lower. This was attributed partly to the fact that the access road condition was better during the latter construction; labor was easier to obtain than during the original construction. Also, in the entire construction program, both under the original contract and under the later work done by Robert E. McKee, was the rapid growth of the Project, which was not fully anticipated and resulted in all organizations being too conservative in their selection of personnel, both in number and qualification. It was originally assumed that the Project could be kept at a maximum of 300 persons, and it was upon that figure that plans for utilities and housing were based. This proved woefully inaccurate because the resident population increased considerably beyond all expectation. Had the ultimate size of the Project been fully anticipated, the various construction contractors would have been able to plan more accurately the

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housing, messing facilities, and utility programs, thus obviating a considerable part of labor difficulties, which in turn would have low construction costs in general.

b. Description of Contracts. - Construction contracts all been lump sum contracts authorized by, and negotiated under, First War Powers Act, 18 December 1941, (Public Law 354-77th Congress) and Executive Order No. 9001, 27 December 1941, pursuant thereto, (except in a few instances Purchase Contracts have been classified as construction contracts). In some cases these contracts were modified to increase amount of construction, in which cases supplemental agreements were numbered as modifications.

5-3. Force Account. - It was necessary to establish a construction and maintenance organization capable of maintaining existing facilities and constructing many necessary additions and alterations to the existing structures. This was done by direct government employees or Force Account. Competent foremen of the various trades, with crews to work under their supervision, were hired by the Project. It was eventually necessary to hire a force larger than is usually required in Army installations for maintenance purposes, because it was soon found that there were many items of new construction other than maintenance that had to be handled by the organization. The normal policy would have been to contract all new construction. However, as many of the items were small which did not have plans and specifications, they were undertaken by Force Account crews. Speed of construction was the most essential factor in all the construction undertaken. Construction work had to be accomplished not only in the Technical Area but also in outlying sites. To accomplish this work with

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minimum of interruption to the Operating Contractor's activity, it was necessary to use construction forces that had been cleared by the Security Division of the Project for work in the areas. For this reason many jobs were undertaken by Force Account that would normally have been done by a construction contractor. It was felt that it would be better to have small Force Account crews working in certain areas all the time instead of having contractor's men moving in and out at intervals, perhaps with different men in the crews each time, thereby increasing the possibility of publicity as to the contents of the buildings. Throughout the entire Project it was necessary to do much of the work at night in order to prevent interruption in the operations of the Operating Contractor. Many times, construction and maintenance crews engaged in work at outlying sites or in the Technical Area had to be interrupted and removed because of highly secret or dangerous operations of the Operating Contractor. A loss in time was thus encountered. Force Account crews maintained a utility yard near the Anchor Ranch Range, and also provided personnel maintenance shops operated by the Operating Contractor in the main Technical Area itself. Force Account work was divided into Post Area, Housing Area, Special Assignments, Technical Area, and outlying areas. The actual work was divided into new construction, maintenance, and operation. The original plan was to use military personnel, with only a minimum of civilians, for this work, in order to keep housing requirements at a minimum and to provide better security for the Project. As the Project grew in size and as military personnel were urgently needed in combat areas, it became more and more difficult to obtain skilled tradesmen from the ranks of enlisted personnel. Therefore, it was necessary to

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supplement the organization by hiring civilians. Skilled civilian and skilled enlisted personnel frequently worked closely together. In some instances civilian foremen were in charge of crews comprised of enlisted personnel and at other times the situation was reversed. It was a constant problem of maintaining harmonious relations between enlisted personnel and civilians because of the pay differential. Usually, where difficulty was encountered it resulted from a clash of individual personalities. As the Project progressed and adequate civilian personnel became available, it became possible to separate the civilian and military crews to a larger extent. Since March 1945 the tendency has been to release Army personnel and replace them either with Civil Service hourly or salary employees. The Force Account was reduced when the construction work was again assigned to outside contractors, in particular Robert McKee. It was further reduced when the Zia Company was established in April 1946 for maintenance work.

5-4. Description of work.

a. General. - As was mentioned in Section 2-5, one of the deciding factors in the selection of Los Alamos was the existence of buildings which could be immediately utilized as housing. There were other structures, too, which could be modified either for living quarters or other necessary uses (Par. 2-7, d). This was the nucleus around which the Project developed. The chief objective was to construct a sufficient number of adequate new buildings to accomplish the mission of the Project and to build these as rapidly as possible. That was the governing rule for the Sundt Construction Company, Morgan Construction and finally Robert E. McKee. This principle applied also to outlying site construction,

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to utilities. Wherever it was possible to use an existing utility it was done.

b. Buildings and Equipment (including all housing). -

Buildings at the Project were of three general classifications: housing for both military and civilian personnel, technical buildings, administrative and utilities buildings. Buildings for military personnel were erected of the regular Theatre of Operations type of construction. The original housing for civilian personnel was mostly of a semi-permanent type of building of an economical design. Part of the apartment buildings were constructed of wood siding, but the major portions used triple-seal board for siding. Interiors were sealed with gypsum board or celotex. Plans for a permanent housing area were drawn early in 1946 by W. C. Kruger Company and were approved 11 June 1946. These buildings are of stucco and concrete brick. Administration and utility buildings (including schools, hospital, etc.) were constructed of wood siding with interiors of $\frac{1}{2}$ -inch gypsum board. (For more detailed data on construction costs, contract numbers and description of individual Post buildings housing see Appendix D-13 and Appendix D-14. For photographs of housing and various Post buildings refer to Appendix E-9 through Appendix E-61. The Post Map, Appendix A-6, shows the Post area as of 31 December 1946.)

The technical buildings originally constructed were of modified mobilization type, with exterior of drop siding on gypsum board sheathing and pitched roof covered with asphalt shingles. Other buildings are modified mobilization type with cement asbestos shingle exterior and interior gypsum board sheathing.

Certain of the Technical Area laboratory buildings are

provided with complete air conditioning and dust proof construction. Some buildings are provided with ceilings of acoustical tile, other buildings in that group are constructed of a single layer of one inch triple-seal gypsum board siding nailed directly to the exterior of the studs and a single layer nailed to the interior of the studs. All joints in the exterior are sealed with mastic. Most of the buildings in this group are provided with automatic sprinkler systems for fire protection. Generally speaking, technical buildings are heated from central boiler plant. The Technical Area is also equipped with an extensive public address system. (Appendix D-15 gives data of construction costs, contract numbers and descriptions of various Technical Buildings. Appendix E-69 through Appendix E-88 show photographs of these buildings. Appendix A-7 is the plot map of the Technical Area.

c. Outlying Satellite Sites. - A total of twenty-five sites (in addition to the main technical area), have been constructed at Los Alamos for experimental purposes (Appendix A-8). As many of these sites were located in rough unimproved terrain, roads, utilities and building construction were necessary before they could be used. A list of improvements and structures is shown in Appendix D-16. (The number of satellite sites mentioned herein above, 25, does not agree with the number listed on the drawing in Appendix A-8 (30 plus the main technical area) nor with the number listed in Appendix D-16 (31) because: some of the sites named were parts of other sites; one name was an alternate for another site; and one name was used for security reasons only.)

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d. Utilities.

(1) Roads, Parking Areas and Walks. - Roads on the Project, constructed under contract by A. O. Peabody as mentioned below (par. 5-2a(2)), by Sundt, and by Force Account crews, include 22.35 miles of dirt roads, 27.17 miles of gravel roads, and 17.30 miles of bituminous surfaced road, totaling 66.82 miles of road. The main road through the Project to S Site is bituminous surfaced, 20 ft. wide and some 8 miles long. Bituminous surfaced roads through the housing areas are 16 ft. wide. Gravel roads throughout the sites are generally 18 ft. wide, and dirt roads vary between 8 ft. and 20 ft. in width.

It was necessary to construct a large portion of the access roads during the winter months when the ground was frozen. Gravel surfacing material was hauled approximately 15 miles from a pit and screening plant located on State Highway No. 4, Project access road. The roads were designed to follow the natural contour of the ground as much as possible in order to minimize cut and fill. Few bridges were constructed, dips or concrete culvert pipe being adapted to solve the drainage problem.

Under the original construction, parking areas totaling 24,000 square yards were constructed, with single bituminous surface treatment on a gravel base. As the job has progressed, it has been essential to provide additional parking areas; these now total 40,450 square yards, of which approximately two-thirds are bituminous surface and the rest are gravel.

Unstabilized gravel surface walks were constructed to the front entrances of apartments and dormitories. These walks are 4 :

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wide and bordered by rough, untreated 2 x 4 timbers to retain the surfacing. A 5 ft. wide walk, gravel surface, treated with one application of asphalt, was constructed from the technical area westwardly to the West Mess. This sidewalk was constructed to alleviate the hazardous condition that was presented to pedestrian traffic on the main street. Additional short sections of walk are located where automobile and pedestrian traffic is heavy.

(2) Electric Power Facilities.

(a) Under original construction, three used Worthington electric power generators were purchased, one having a capacity of 190 KW, one 255 KW and one 380 KW. These units were purchased with the agreement that they would be reconditioned by the vendor. However, because of the urgency for power, it was necessary to purchase the unconditioned units, and recondition them after installation. Upon the expansions which started about the time the power plant was finished it became evident that the three units would not provide sufficient power to meet the demands of the growing Project. As it was impossible to shut down any of the units for necessary overhauling, the power plant was expanded by purchasing and installing additional units. Two generator sets, each rated at 1000 KW output, together with all necessary control mechanisms and operating auxiliaries, were added to the original plan. The sum of the sea level rated capacities, 2825 KW, corrected to operate at 7300 ft. above sea level, is reduced to an estimated 2193 KW actual output. The diesel engines for all units are started by air at 250 psi pressure, supplied by air compressors connected to six-cylindrical air receivers having a combined capacity of 177 cubic feet. The engines

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the units operate on grade 2-102 fuel oil, having a specific gravity 38.2. Fuel oil is stored in three 25,000 gallon and one 10,000 gallon steel tanks, supported on concrete cradles, located approximately 10 feet west of the power plant building. All piping is enclosed in a concrete tunnel between the tanks and power plant building. It is arranged so that the fuel oil can be pumped from the 25,000 gallon tank to either of two Sharples Super Centrifuges, thence directly to the engines or back to the 10,000 gallon tank, which is used only for the storage of centrifuged oil. Control of the four outgoing primary circuits was obtained at a switching station, which consisted of a four-pole structure with cross timbers for mounting disconnects and busses. The station was designed so that all feeders from the power plant to the switching station could be paralleled or any one area could be fed from any of the four feeders from the plant. This arrangement was later changed when outdoor cubicles and additional switch gear within the plant were added. These changes, as of 30 June 1946, constituted twenty-six outdoor cubicles, with nineteen circuit panels within the plant proper.

(b) Because of further expansion it became apparent early in 1944 that additional power would be required. Detailed records were kept of the power actually used. The point was reached during the months of August and September when the load on the plant exceeded the maximum load for safe operation over an extended period. In other words, in order to accommodate the peak loads during the day, it was necessary to operate all five units of the plant, and, had one of the larger units been out of order, it would have been necessary to disconnect some of the load from the power plant. Because electric power of standard

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voltage and frequency was such an essential factor for the work being performed by the Technical Group, it was essential to take immediate steps to provide additional power. The solution to this problem was approached from two viewpoints. One was that of providing an additional diesel engine driven generator in the existing power plant. The other was to construct a high voltage power line to the project, for a distance of approximately 24.6 miles, from a point where it would tie into an existing transmission line of the New Mexico Power Company. A study made of both schemes, and investigation revealed that the estimated cost of constructing the power line, to supply between 1000 KW and 2000 KW would be \$156,500 and that of providing a new generating unit to supply 1,000 KW would be \$144,228. The speed at which the line could be constructed far exceeded that attainable for the purchase and installation of the generating unit. Because it was felt that the power line would allow greater flexibility, that operating costs were comparable and that it would possibly allow for future expansions, construction of the high voltage power line, 44 KV, was commenced in October 1944, and completed during February 1945. In April of 1945, an estimate of the power needs through October was made by the Operating Contractor and Area authorities. This estimate forecast a peak load of 5300 KW, which exceeded the combined output of the power plant and the available facilities of the New Mexico Power Company. Planned expansion of the Power Company facilities promised only a 1000 KW increase in available power but even that could not be obtained prior to a target date of January 1946. Two 1000 KW diesel engine generating units were procured and installed. Operation of these units was delayed until January 1946,

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because some of the auxiliary equipment was damaged in shipment.

(c) The electric distribution system is supplied through the switching equipment in the vicinity of the power plant. Primary feed from the plant is 3 phase, 60 cycle, 2400 volts, and is distributed through twelve primary circuits. Three of the circuits serve the Technical Area, one serves the troop housing and service area, and the other eight serve the balance of the post housing, administration area, and outlying sites. The voltage is stepped up to 13.1 KV for one of the twelve circuits which serves the "S", "P", "R", 2 Mile Mesa, and South Mesa Sites. With the exception of small amounts of underground cable at the outlying sites, all power is distributed on lines; high voltage poles vary between 35' and 45', while low voltage poles vary between 25' and 35' in height. The high voltage distribution totals 40,102 feet in length, or slightly less than eight miles, and conductors are of #4 bare copper wire. The main area is served by 22,755 feet of primary distribution lines, 18,200 feet of secondary and 19,811 feet of service lines; conductors consisting of copper wire, varying in size between #4 and #10, are carried on some 419 poles. Step down transformers are generally mounted on the poles close to power needs.

(d) During September, October, November, and December 1946, it became apparent that a still further expansion would have to be made to bring the power up to an adequate point. It was impossible to increase the usage from the New Mexico Power Company, so Black and Veatch, Kansas City, Missouri, Consulting Engineers, investigated the situation and recommended that two 1715 KW diesel engines

generating units be procured. Bids were accepted and these units were purchased from Nordberg Manufacturing Company, Milwaukee, Wisconsin. The addition also called for an expansion of the power plant building and panel boards, as well as revamping some of the distributing system sub-stations, installations and transformers. It is estimated that the job will be completed October 1947 with all supervisory work being carried out under the contract with Black and Veatch.

(3) Water Supply. - Water is now obtained from five main sources: Los Alamos Creek in Los Alamos Canyon, Water Creek in Water Canyon, Pajarito Canyon, Guaje Creek in Guaje Canyon and by a pipe line from wells near Rio Grande River Valley. A small supply is obtained from American Spring South of Water Canyon. These various sources were or are being developed by stages as the scope of the Project and its demand for water rises. Extensive studies of the most economical method of supplying the Project's water needs were made from time to time and the results of these studies embodied in a "Report of Water Supply, Los Alamos Project, Los Alamos, New Mexico" prepared by the U.S. Engineer Office, Albuquerque, New Mexico, and R. O. Ruble, Consulting Engineer Santa Fe, New Mexico, dated 9 October 1943 (Appendix F-6). The Los Alamos Ranch School had obtained its water supply from Los Alamos Creek through a six inch pipe line, which was fed from a small reservoir created by the construction of an earth fill dam across the creek channel. At the time the property was acquired the dam was incomplete. In connection with the initial construction program for the Project, the height of the dam was raised, a concrete spillway was constructed, riprapping and other incidental construction work were completed. At the time, the

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resulting reservoir was believed adequate for the Project as planned. As the size of the Project increased, however, it became necessary to augment the supply, and the Water Canyon, American Spring and Pajarito Canyon sources were developed. (Appendix A-9). At a later date, further increases in the size of the Project, smaller flows than anticipated from all sources due to extreme drought conditions, and the pollution by algae of the water impounded in the Los Alamos Reservoir resulted in another deficiency of supply. A line laid on the surface of the ground to Guaje Canyon to alleviate the emergency was regarded merely as a temporary expedient. At this time a reanalysis of Project water demands and a more complete study of minimum stream flows was undertaken, from which it appeared necessary to maintain a continuous flow from Guaje Canyon in order to supply the needs of the Project adequately. The Guaje Canyon line was then winterized by burying it, mounding it with earth or wrapping it with insulation, depending upon topography to determine the cheaper method. Pipe lines include a 6-inch line from Water Canyon source to its junction with the Los Alamos Canyon line, from which point one 6-inch and one 8-inch line extend directly to the Project. The Pajarito Canyon creek water is transferred from its source by a 6-inch pipe line, (which replaces an open flume originally used) to a small earth reservoir in the vicinity of Anchor Ranch, thence through a 6-inch line to the connections at the site, with unused water continuing through the 6-inch line to a connection with the Water Canyon 6-inch line. The Guaje Canyon supply line is made up of 4-inch, 4½-inch and 6-inch pipe. Flow from all these sources to the Project is possible by gravity. The booster pump station on the Guaje Canyon line is for the purpose of

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increasing the rate of flow from the source to the Project and also enable delivery from the source to the Low Alamos storage reservoir. This reservoir is kept as full as possible at all times, all possible excess flow from pipe line deliveries being delivered to it. The earthen reservoir at Anchor Ranch is considered as dead storage for fire control reserve for the Anchor Ranch Site. Ashley Pond, a swimming pool of the Los Alamos Ranch School, which is adjacent to the north side of the Technical Area, was also converted to a fire reservoir. The reservoir at Los Alamos Canyon, with a total capacity of 13.5 mg, is the main reservoir. The 300,000 gallon tank on the Water Canyon line, known as the equalising reservoir, is operating storage. A 250,000 gallon wood elevated tank (Appendix E-3) was constructed to provide distribution pressure, as well as four 150,000 gallon wood tanks, (Appendix E-2) which were used for storage. Water from the reservoir to these tanks passes through either the six or the eight inch line to a chlorinatic house at the west extremity of the main area. Distribution to the fire sprinkler system and fire plugs is direct to the main from the reservoir. In addition, connections to the pressure tank are possible, thus ensuring protection in case one source is not in operation. Automatic-starting pumps provide pressure to the sprinkler system. Water distribution mains in the central area include: 3,650 feet of 6-inch pipe; 12,400 feet of 8-inch pipe; 1,750 feet of 10-inch pipe; and 250 feet of 12-inch pipe. This system was augmented in December 1945, January and February 1946, by the delivery of approximately 300,000 gallons a day by truck from the Rio Grande River Valley, approximately 20 miles distant. This was made necessary partly because of a mechanical breakdown and freeze:

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of one pipe line, and partly because of an unusually dry season with excessive demand.

In August 1946, three wells were drilled in the Rio Grande Valley further to supply the Project. Approximately nine mile 14-inch pipe connect these wells to four pumping stations, which in lift the water 1800 feet vertically to a new 1,000,000 gallon stand steel storage tank (Appendix E-4). This tank was completed 29 November 1946 and replaced the 250,000 gallon wooden elevated tank mentioned above. As of December 1946, the permanent pumps were not installed and the new water supply was being utilized by means of temporary pumps which were gasoline driven. A new power line to feed these pumps is under advanced construction with a completion date of August 1947, at which the permanent pumps should also be in place.

(4) Technical Area Steam Plant. - A steam plant, designated as Boiler House #1, was initially constructed to supply steam to the technical buildings first constructed. Two second-hand, coal burning, hand fired, locomotive-type boilers, each of 100 H.P., together with pertinent equipment, were installed. A network of concrete tunnels extending from the boiler house to the various buildings, enclosed the steam lines, pumped-condensate return piping and compressed air piping. Under an early expansion a second steam plant was constructed to serve additional technical buildings. Boilers in this plant were two Kewanee #586 and three #587 fire tube boilers, all of which were coal burning, fired by Riley Jones hydraulic ram-type stokers. The five boilers' total capacity was 826 H.P. In addition to the regular automatic water feed regulators and automatic control of the feed water heater, the plant was

also equipped with complete automatic regulation of the combustion r
After one year of operation of the two original boilers in plant #1,
used boilers were leaking so badly that it became evident that they
have to be replaced if that plant were continued in use. Therefore,
Boiler House #1 was dismantled and one 17½ H.P. boiler was added to
House #2. (Appendices D-15, E-87.) At a later date these six boile
were converted from coal stokers to oil-fired.

(5) Sewage System. - The sewage system which was
originally designed and constructed soon became too small, because th
progressive expansions of the Project could not be foreseen during th
original planning. A factor contributing to the original sewage dis;
system, consisting of numerous septic tanks serving small areas, was
irregular terrain, which made it impracticable to have all sewage col
in a central sewage disposal system without the installation of pumps
At the beginning, when a central system was considered, the small num
of people served made it more economical to install the septic tank
system. The additions to the Project over-loaded the tanks, and, eve
though new ones were constructed, it proved more economical to clean
tanks at more frequent intervals than to construct a larger number. I
immature effluent from these tanks is drained to nearby canyon floors,
where it soon disappears into the ground. The present system in the
central area includes: 61 manholes; 30,035 feet of 8-inch vitrified s
pipe and 7,265 feet of 6-inch similar pipe for distribution lines; 3,7
feet of 8-inch similar pipe and 23,091 feet of 6-inch or smaller simil
pipe for service lines; and approximately eight concrete septic tanks.
In addition to this system there are numerous small tanks and systems at

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outlying sites. At this time a contract has been awarded Robert McKee Construction Company for a new central sewage disposal plant to replace present over-loaded and obnoxious septic tank system. This will consist of collecting lines, booster pumping stations, and a modern trickling filter disposal plant. It is to be in service by September 1947, at which time all the septic tanks in the main Project area will be demounted, thoroughly sanitized and filled in. An investigation is now under way the utilization of the effluent from the sewage disposal plant for irrigation for the beautification of the areas on the Project.

(6) Telephone System. - When the land for the Project was acquired, the telephone communication from the area to the Mountain States Telephone and Telegraph Company lines was a Forest service line number nine galvanized iron wire on native untreated poles. This was soon replaced by an Army Field wire connection to the same system but direct to the Ranch School site. In February 1943, the telephone company was requested to construct two connections, 18 miles long, from their lines at Pojeaque; they were finished some six days later. The PBX board was originally installed in the Administration Building, T-1, with a switchboard in "T" Building, T-408, and tie lines between the two boards. A year later the two boards were combined in "T" Building. Six months later the installation was moved to "A" Building, T-430, in the Technical Area and increased in size to a three position board. It has since been increased to a six position board. All work was done by Mountain States Telephone and Telegraph Company under contract. In March 1945 the total number of lines to the Project was raised from five to eight. Six additional lines and a complete dial system are at present under construction.

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to permit installation of private telephones in residences, which heretofore have not been permitted. Estimated installation and completion is July 1947.

(7) Teletype. - The first teletype machine was installed in the Bishop Building in Santa Fe in March 1943. This was removed from the Project and installed in "F" Building by the Mountain States Telephone and Telegraph Company. The Army Engineers installed a coding machine, this TWX machine. In May 1943, these were transferred to "P" Building and later two more TWX machines were added, with Army coders. On 3 November 1945, the Operating Contractor cancelled the contract on one of these machines, and at the end of 1946, the Army operated with two machines and coders.

(8) Natural Gas System.

(a) Early in January 1946 an investigation was started on the possibility of installing a natural gas system, thereby eliminating the monthly use of 300,000 gallons of fuel oil and 1,500 tons of coal, as well as effecting a small saving of electric power. The feasibility of such a plan was clear, and a contract was entered into with the Southern Union Gas Company of New Mexico and Texas, Dallas, Texas, for laying the necessary pipe to furnish the Project daily with three and a half million cubic feet of gas. This line consisted of 26 miles of 10-inch pipe additions for the main line and to parallel existing lines near Farmington, New Mexico, approximately 130 miles distant and the laying of 20 miles of 8-inch line from a point near Santa Fe to the Project - about nine miles of which was laid by the McKee Company for the Project and the rest by the Gas Company under a Government

subsidized contract to be amortized. It was also necessary to install one 400 HP compressor station at Bernalillo, New Mexico.

(b) A contract for converting the existing heating and power facilities to natural gas was let to the International Manufacturing Company, Kansas City, Missouri, on Contract No. AF 29-78. This work involves the conversion of the two 1715 KW Nordberg generating units for the use of natural gas during off-peak seasonal demand periods only. This conversion will be completed about 1 Sept 1947.

(c) In December 1946, a 4.5 mile additional parallel line of 10" pipe was laid close to Farmington, New Mexico, to increase the output to four million c.f. per day. The total cost, for this output, is estimated as \$704,000.

(d) A further plan under discussion with the Company for the laying of other parallel lines and an addition to the compressor station will eventually bring the output up to five million c.f. per day. It is estimated that this would increase the total cost \$981,000.

(e) The system ultimately will include gas mains and laterals throughout the entire Project to furnish necessary gas for heating and cooking in the majority of the houses. Substandard houses and trailers will not be considered in this group.

5-5. Progress. - Construction problems were unique and in a measure impeded the progress of the contractors. It was very difficult to obtain qualified skilled workmen, because of the isolation of the Project and because the immediate area was not a good labor market.

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Transportation of employees and building materials was operated over difficult access roads. Housing for workmen was not adequate. Construction schedules could not be strictly adhered to, for often while on one job it was necessary to start others of equal or higher priority with the same crews, thus slowing down the original work or stopping completely. The type of technical construction, the secrecy involved, the terrific pressure of time were other delaying factors. The M. M. Sundt Construction Company was 54 percent complete on their original contract on 2 February 1943, approximately two months after construction was started on the contract, but, because of the expansions, it was not until 25 April that they were 96 percent complete. After that date increased construction requirements extended the time of the original contract to 15 December 1943. Inasmuch as Robert E. McKee Company was not assigned a large amount of work to be done at any one time, but awarded additional construction as it became needed, it can only be stated that the dates set, with few exceptions, were met by the contractor. The construction forces at the Project varied from time to time, because at certain periods the work apparently was almost complete and the contractors cut down on their personnel, and because at other times, a number of urgently needed facilities were required, it was necessary for the contractor to hire as many men as possible. The force employed by M. M. Sundt Construction Company varied between 250 and a peak of 3,000 whereas the construction force of Robert E. McKee varied between 100 and 1,500, being maintained at between 700 and 1,000 at most times. The construction crews of Force Account were built up from 75 men to approximately 1,800 during the summer of 1945. Construction progress could be

summarized by saying that completion dates and construction schedules were maintained only for individual jobs and not for the construction being done by the unit as a whole, largely because it was not practical to forecast the entire program.

5-6. Costs.

a. The tabulation below shows in round numbers the total cost of the Los Alamos Project, as furnished by the Cost and Accounting Section of the Fiscal Division:

University of California contract	\$31,987
Major Construction Contracts thru Albuquerque District	9,317
Design and Engineer (Kruger)	177
Major Contracts thru Manhattan Engineer District	17,519
Design and Engineer (Kruger)	521
Cost of Utilities (Including connection of new power line to New Mexico Power Company)	6,849
Design and Engineer: (Kruger)	48
Black and Veatch	164
Force Account (Estimate)	6,000
Operation and Maintenance	1,416
Real Estate	419
Warehouse Inventories, Salaries, Miscellaneous	<u>15,458</u>
Total	\$89,867

b. The Force Account costs include a certain amount of operation and maintenance, inasmuch as hired labor crews worked in maintenance as well as construction, and no line of demarcation was established in maintaining costs until the end of 1945 when the Cost Accounting Section was formed.

c. Building and housing costs are shown in Appendices

D-14 and D-15. Major contracts with costs are located in Appendix D

d. The same problems mentioned as hindering the progress of construction (Paragraph 5-5) were contributors to costs.

e. Because the construction work, as originally planned for the Project, was relatively small, the original contractor did not set up a very large plant or organization to handle the work. The increased work came in small amounts and because the ultimate development could not be foreseen, the construction contractor did not employ the required personnel or construct plant facilities that would normally have been provided for a job of the magnitude that was finally developed. Had the construction contractor known at the outset that the job would be as large as it was, a considerable saving in cost would have been realized. Another reason for the high cost of individual items, in comparison with such items at other localities, was the isolation of the Project.

f. The State Highway leading to the site was not improved until after M. M. Sundt Construction Company had completed the first construction work. This road was very narrow, had steep grades, poor alignment, and several switchbacks and was very dusty. All materials and equipment for the Project had to be hauled from the railhead at Sandoz, New Mexico, approximately 46 miles, over this bad road, which was one of the contributing factors to the high cost. The work accomplished by McKee was also high in cost in comparison with work done at better located jobs. However, the costs of the work done by McKee were in many instances less than those of the original contractor. This is attributed to the fact that the access road was in better condition. Furthermore many complex mechanical installations were required by the operating

contractor. In general, these installations comprised the largest percentage of the work in the technical buildings and outlying sites. It was necessary in many instances to delay completion of a building because of slow or uncertain delivery of critical technical items. All construction work on the Project was conducted on the basis that the construction crews would have to be removed from the job whenever required by the operations of the Operating Contractor, and many times construction lost considerable time because of this condition. The nature of the work being conducted by the Operating Contractor militated against representatives of that organization furnishing design information that would remain unchanged during construction. After it was determined that additional facilities were required, the time allowed for construction of the buildings or facilities was very short. For this reason construction was often commenced when only a small percentage of the plans were completed. Many changes were necessary during construction because of revised requirements of the Operating Contractor and this condition added to the cost of construction.

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SECTION 6 - ADMINISTRATION AND OPERATION OF COMMUNITY

6-1. General. - Headquarters at this station was directly responsible for the security of the Post; and the MP Detachment, let through the Intelligence Officer, handled this phase, which included guarding all entrances, patrol of roads, and guarding all outlying s. Operation and maintenance of the Post were the responsibility of the furnishing of lights, water and sewage facilities, firing of furnance hauling of garbage, maintenance of buildings and roads, keeping the clean, and similar functions, were handled primarily by the men of the Provisional Engineer Detachment of the 8th Service Command. The Post responsible for operating all mess halls and this was done with civil and military personnel, supervised by men of the Engineer Detachment. Commissary and Post Exchange were operated by the Army and, as stated hereinafter, were the only means available to Post residents for secure their food supplies and other necessities. Another direct responsibility of the Army was to furnish furniture and similar articles for all doctories and, to a large extent, to families living in apartments. The operated the Station Hospital and staffed it with Medical Officers; however, all nurses and later two female doctors (who were married to men employed on the Project, and worked part time) were on the Operating Contractor's payroll. The main reason for this was that nurses could not be hired for the salary as set up by Civil Service, nor were Army nurses available. These responsibilities were handled by the Army until the early part of 1946 when it became apparent that the military unit would continue to shrink in size, and it would become impossible to

administer the above service functions satisfactorily with such a reduced force.

After much discussion, a new company was formed 1 April 1946, municipal organization to take over these services. The Zia Company it was called, entered into a cost plus fixed fee contract with the Government on that same date. (Appendix F-7.) Since that date the organized company has taken over the operation of hospital, schools, transportation, housing, utilities, maintenance, and other service functions, with the civilian personnel, formerly engaged in these duties for the Government, transferred to Zia and carried on their payroll. The Zia Company officers are Robert E. McKee, President; Jack Brennan Vice President; Resident Manager for Zia is Elmo Morgan, formerly Lt. Col. Morgan of the Albuquerque District Engineers Office.

6-2. Housing.

a. Civilian. - Housing for civilians was provided primarily for the scientific personnel of the Operating Contractor. The policy was established to have as many as possible of the personnel living for the Commanding Officer in a service capacity commute from Escondido, Santa Fe, or other nearby communities. As the Project grew in size, it became more and more difficult for various Section Heads of the service organization to obtain a sufficient number of qualified personnel who were willing to commute. Therefore, key personnel were allowed to be housed on the Site, with the provision that, should the housing become necessary for scientific personnel, such service personnel would be forced to find living accommodations elsewhere. Navy officers were considered in the same category as scientific personnel and accorded

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same privileges in housing. It was the policy for only a minimum of Army Officers to have family housing on the Project, and it was understood that should housing become essential for scientific personnel, officers having their families on the Site would be asked to vacate thirty days notice. At all times, the number of people being housed the Site was kept at the minimum commensurate with the workload. Had adequate housing been available at all times for service personnel, as has been mentioned before, it would have been much easier to provide necessary services. The lack of housing caused a great turn-over of personnel and it was very difficult to induce skilled mechanics or qualified engineering personnel to work at the Site. Minimum housing was provided because each new family multiplied the necessary personnel and service capacity needed for maintenance. The limited amount of water, electric power and sewage disposal facilities, and the transportation fuel to the Site were additional problems. Hospital, messing, commissary, and other public facilities, required expansion in direct proportion to the number of families housed.

(1) Family Housing includes apartments, duplexes, houses of standard construction, for 617 families. These family units as of 31 December 1946, comprised (Appendix D-14): A further program of housing is under way providing 300 additional Western type units. These are permanent structures of stucco and concrete block. Besides these, 240 houses from Ft. Leonard Wood, Missouri, have been shipped in and will be reassembled at this Project the early part of 1947. Another addition of 39 Metal Prefabricated Houses is planned for use by the first three grades of Non-Commissioned Officers.

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The available 617 units do not include 16 Ranch Houses which are remodeled structures of the original school, 51 winterized hutments, 47 Government-owned Standard trailers, 25 Government-owned expansible trailers, 56 Pacific Hut apartments, 30 National Hut apartments and approximately 250 privately owned trailers. The Ranch Houses, hutments, and trailers are inferior to the 617 apartments, duplexes, houses constructed under Government contract, some^{of} which in turn can be considered permanent housing.

(2) Dormitory facilities are provided for single male and female civilian personnel, plus a few dormitories for married civilians without children. (Appendices D-14, E-31, 32) All of the better type dormitories are for the purpose of housing scientific personnel employed by the Operating Contractor. Some rooms are made available to key personnel of the service organization working under the Commanding Officer. Cheap-dormitories of cheaper-type construction are for mess attendants, furnace firemen, janitors, hospital attendants, and other employees of low salary brackets. At the end of 1946 there were 36 dormitories with approximately 1253 living quarters, and 55 barracks providing another 1496 individual units.

(3) Miscellaneous housing facilities. - Better housing is provided, mainly for visitors, in Fuller Lodge, (Appendices D-14, E-13), Fuller Lodge Guest Cottage, (Appendices D-14, E-12), and the Bluff House, (Appendices D-14, E-11), which were existing stone and log structures from the Los Alamos Ranch School. These last quarters are available for transients and some of the senior scientific personnel who are single.

Approximately 118 hutments, 16' x 16', were erected by the original construction contractor (Appendices D-14, E-26). The hutments housed skilled and unskilled tradesmen employed by the construction contractor and also the same type of personnel employed directly by the service organization in Force Account work. These hutments have been in use from time to time depending upon the amount of work being done. At this time all such structures are closed.

Robert E. McKee, Construction Contractor, furnished labor to construct an H-shaped dormitory for housing approximately 90 key personnel of his company. It was constructed from CCG Sections which were furnished the contractor free issue on the basis that when his company finished work the structure would be available for the service organization.

Housing control and administration of both apartment and dormitory facilities were under the Operating Contractor until February 1946, at which time the Army assumed control. A separate structure, the primary school of the Los Alamos School Buildings, was established as the Housing Office, where all the administration work was done and all records were kept. Later this was converted to the Technical PX and another of the original Los Alamos Ranch Buildings was used for the Housing Office. Prior to the time that the Army assumed control a liaison officer, representing the Commanding Officer, worked with the housing authority of the Operating Contractor on all matters which required cooperation or approval of the Commanding Officer. Such matters included rental rates, maintenance of buildings, quotas of housing facilities to be made available for employees of the Commanding Office

and requests for and provision of additional housing. The Housing Office also provides various services such as maid service, express deliveries, etc., which since April 1946 have fallen under the Zia Company contract.

The rental rates for family quarters at this Project were established in accordance with Orders B of the War Department, dated 15 January 1943, and were approved in writing by the District Engineer, Manhattan Engineer District, in February 1943. The rental rates were based on Civilian Personnel Regulations promulgated by the General Accounting Office. These rates were based on yearly salary brackets and are listed below:

<u>Yearly Salary</u>		<u>Monthly Rent</u>
\$0	to \$ 840	\$ 5.00
841	1080	8.00
1081	1560	10.00
1561	1920	12.00
1921	2200	15.00
2201	2600	17.00
2601	3100	23.00
3101	3400	29.00
3401	3800	34.00
3801	4400	42.00
4401	5200	50.00
5201	6000	59.00
6001	and up	67.00

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In addition to rent, fees for utilities were levied on what was considered an equitable charge and were comparable to the charges being made at other Projects at which Government housing was furnished. During the Spring of 1944, estimated costs of the utilities furnished were obtained and it was found that these costs exceeded charges being made by some three to five times. After considerable reviewing, the utility charges were not changed for the following reasons:

(a) Actual cost greatly exceeded rates being charged in normal cities and communities. This was due to the isolation of the Project, inefficiency of the local labor, and the high cost of transportation from the nearest railhead in Santa Fe, New Mexico.

(b) An adjustment in utility charges would have caused considerable unrest in the civilian population.

(c) Good living quarters at a reasonable rent and utility rate were an inducement to obtain civilian personnel to staff the Project adequately. Utility charges which were actually made and estimated cost are shown in Appendix C-1.

The accommodations of the "efficiency apartments", one bed-room, living room, with tiny bath and kitchenette, were considered below the scale of the other apartments with one or more bedrooms. A authorization for a flat 15 percent reduction of the rental charge for "efficiency apartments" was approved by the District Office in December 1943. The accommodations furnished in the remodeled ranch houses and winterized hutments were considerably below scale, which also resulted in a 15 percent rent reduction. The rental charge for both the Civil Service and the Operating Contractor's employees was based on monthly

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salaries as reflected in the rental scale previously shown. The rental rate for Civil Service employees was figured on the basic salary, which covered a 40-hour week (despite the fact that they were working over to an approximate total of 48 hours per week). The rental rate of the employees of the Operating Contractor was reckoned on the basic salary which covered a 48-hour week. This method of computing rental rates was in effect until 1 March 1945. On this date, the rate being charged for the Operating Contractor's personnel was reduced and was figured on a 40-hour work week, on the same basis as the rate for Civil Service Employees (Appendices D-17, D-18, D-19, D-20, D-21 and D-22.) When the work week was reduced from 48 to 40 hours without change in pay, there was a corresponding increase in rent for the University of California employees. Trailer space with utilities was provided for private trailers at a rate of \$5 per month. The 47 Federal Housing Administration trailers (Government-owned standard trailers) were rented for a fee of \$28.00 per month, including all utilities; and the 25 Government-owned expansible trailers were rented for a fee of \$33 per month, including all utilities (Appendix E-28.) These rates were determined by using the charges made at Dallas, Texas, by FPHA as precedent for the same accommodations. Pacific Hut Apartments (Appendices E-14, E-27) being 16' x 20', were considered comparable to the standard trailer units, and a similar \$2 per month charge, including utilities, was made. Quarters for single personnel living in dormitories or barracks are being charged at the following rates:

<u>No. in one room</u>	<u>Monthly Rent</u>
1	\$13.00
2	8.00
3 or more	6.00

Maid service and linen service are furnished at \$2.00 per person per month.

b. Troop Housing. - Troop housing was to have been set up on the basis of 40 square feet per man for enlisted men and 50 square feet per man for enlisted women, as provided by War Department Circular on this subject. But the rapid growth of the military units and the lack of barracks space made it impossible to adhere to that policy. Structures used were Theatre of Operations type, or modified mobilization type in the case of WAC barracks buildings. Units housed include the Special Engineer Detachment, WAC Detachment, Military Police Detachment and the Provisional Engineer Detachment. (Appendix D-14.) Some barracks not in use by the Army are now used for civilian barracks or have been converted to dormitories.

6-3. Messes, Cafeterias, Restaurants, and Commissary. - The messes, cafeterias, restaurants, and commissary were of prime importance to such an isolated Post where all meals and staple food had to be provided. It was the policy here, as with Projects where other than Government eating facilities are not available and where Government employees are involved, to provide meals at practically food cost, with the Government subsidizing the eating establishments on that basis. Therefore, cost of operation reflected an expected loss in these facilities. However, after September 1946, prices at the various restaurants were raised.

considerably to partially offset this loss. (Appendix F-23.) Below are listed detailed descriptions of the various establishments:

a. Fuller Lodge, T-31. - In February 1943, Fuller Lodge (Appendices D-14, E-12), one of the buildings of the Ranch School, was taken over by the Government and operated under Civil Service for the housing and messing of Post and Technical Personnel. The Lodge has a large dining room, two stories high, with a balcony and two mammoth fireplaces which practically cover the entire north and south ends of the room. This room has an approximate seating capacity of seventy. A smaller private dining room, called the "Curtis Room", seats twenty. This and a similar room upstairs contain stone fireplaces. Nine beds done in Western style are available. From March through July 1943, meals served were approximately 4,000 per month. This figure has gradually increased to approximately 13,000 meals per month. The original group of WACs was served at Fuller Lodge. When the group became too large, the new arrivals ate at North Mess. Later when the WACs moved to the Western Area, they messed at the West Mess. The Lodge has a group of regular guests who pay \$60.00 per month for meals, but this group is much smaller than the actual capacity thus allowing other site residents to have casual meals at the Lodge. Originally the monthly board at Fuller Lodge was \$25.00 per month, reaching its present rate in jumps to \$40.00 and then to \$50.00 the next month. These meals are normally secured by making reservations a day in advance. Charges through 1944 were \$0.50 for breakfast, \$0.65 for lunch, and \$1.00 for supper, raised on 1 October 1946 to \$0.75 for breakfast, \$0.85 for lunch, and \$1.15 for supper. Fuller Lodge Guest Cottage, part of the Lodge operation

under Mr. H. M. Acher, has two bedrooms, one fireplace, and private and is used for official visitors only.

b. North Mess, T-103. - In April 1943, North Mess was opened to accommodate the civilians on the Project. 675 meals were served the first day. On the third day expansion was started in order to accommodate the increasing patronage. During the second week of operation, 5800 meals were served, the third week, 6300 meals. Other structural additions were made in July 1943, October 1943, and January 1945, raising the seating capacity to 400 persons. The patronage during this period has increased to 58,250 meals served per month, and the staff, to one mess Sergeant, twelve cooks, twenty kitchen helpers, and thirty-two attendants. Charges for meals were \$22.50 or \$25.00 per month depending on attendance over week-ends, or \$0.40, \$0.50, and \$0.65, for breakfast, lunch and supper respectively for separate meals. The rate established in September 1946, was \$0.65 for each meal, or \$10.50 for 21 meals. (Appendix E-57.)

c. West Mess, T-228. - In September 1943, West Mess, so named because of its location at the west end of the community, was opened (Appendix E-67, 68). It served the civilians living in this vicinity, and also provided mess for the WAC Detachment until the Spring of 1945, when their own mess hall (West Cafeteria) was completed. The original staff was one cook, one helper and soldier KP's. Later it was increased to one mess Sergeant, two bakers, one butcher, twelve cooks, twelve cook's helpers, and 38 attendants and charwomen. In January 1946 all cooks were military because civilian cooks could not be obtained and living quarters could not be provided. As the war drew to a close, the

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trend was to release the soldiers and replace them with civilians. In 1946 West Mess was converted into a completely military mess for combined military detachments. While West Mess was open to civilians the charges for meals were the same as those noted above for North Mess.

A small mess was established at "S" Site in March 1945, under the management of the West Mess, with a seating capacity of 250. This was used for the convenience of personnel at "S" Site only.

d. WAC Mess or West Cafeteria, T-227. - (Appendix D-1) completed in the Spring of 1945 for the WAC's. Its original staff was composed of six cooks and one mess Sergeant. During the first month's operation it provided mess for the WAC Detachment only; then civilians and military personnel alike were served, until October 1946 when the WAC's were inactivated. After that date it became West Cafeteria, with a price level the same as that established in September 1946 at North Mess, namely, \$0.65 for each meal or \$10.50 for 21 meals.

e. East Cafeteria, T-200. - In March 1945, East Cafeteria was opened under the management of Mr. H. M. Acher. (Appendix and E-52.) It was constructed on a more decorative scale, equipped with nicer furnishings, and provided a wider range and variety of excellent foods than did the Mess Halls, in order to give Project personnel better meals in a more restful environment. In this respect it was definitely a morale factor. It has a seating capacity of 400 and serves resident and transient, military and civilian personnel. All meals served are on an individual cash basis. The Cafeteria is readily accessible to most of the dormitory residents and their patronage is large. After April 1946 the above Mess Halls, Fuller Lodge, and East Cafeteria all were under

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Zia Company contract. East Cafeteria has always been operated on an a-la-carte basis, with prices based on food costs and certain overhead costs.

f. Military Messes. - In addition to these eating establishments, a mess hall was constructed early in 1943, for the Military Police Detachment, which also provided meals for the Provisional Engineer Detachment until that organization was inactivated 1 July 1946. This Military Mess was closed when the military organization was set up in the Western area.

The Post Exchanges, as noted later, provided eating establishments; in fact, the Tech PX at one period operated 24 hours a day.

g. Commissary.

(1) The commissary was opened in March 1943. (Appendix D-13.) The opening stock was taken over from the Los Alamos Trading Post (Ranch School) and an entire stock was purchased from a merchant in Santa Fe who was closing out his store. At the beginning the intention was to sell only to those employees actually living on the Project; however, it was the same story of Project expansion beyond the original plan. Greater numbers of people who lived off the site were employed and because they could not reach other food stores during the working day, the commissary opened its doors to them as well as to Project residents. As the Project continued to grow, the original installation had to be expanded, and storage facilities for perishable and non-perishable foods, as well as additional store space, were built. The warehouse space was urgent because of the isolation and long haul involved. The necessity of maintaining good morale among the civilian population in this isolated community made

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it desirable to stock a large number of items ordinarily not provide Army Regulations, through the Quartermaster Depot, whose main function is to supply military messes. Permission was granted 12 August 1944 to carry "Unauthorized Items" in a letter from Lt. Col. Whitney Ashbridge (Appendix D-24). Procurement of these items was in accordance with Army Regulations and they were sold at prices which precluded any loss to the United States. Various personnel problems entered into the operation of the commissary. The limited salaries under Civil Service and the limited budget made it necessary to supplement the staff of butchers, warehouse men, etc., with military personnel. The following tabulation indicates the

growth of the store:	<u>Military Staff</u>	<u>Civilian Staff</u>
1 April 1943	0	8
1 April 1944	11	15
1 March 1945	14	32
1 March 1946	12	79
31 December 1946	10	83

(2) All accounting was originally handled by the Finance Section of Project Headquarters. In the fall of 1944, an accounting section was established in the Commissary to receipt, issue, and requisition in accordance with Quartermaster procedure. Some minor deviations are in effect because of local conditions. One deviation is a 10% charge on cash purchases, which offsets additional services and losses, such as delivery service, milk bottle losses, check cashing costs, etc., which are not usually involved in Quartermaster Sales stores. This charge is waived on sales to Post Exchanges, Nursery School, and Technical Area (Appendix D-25.) Another deviation was handling larger sums of money

than Army Regulations stipulate. This procedure was established because security would not permit contractor employees to have bank accounts in Santa Fe or nearby communities. (Appendix D-26.) As no other organization was capable of handling funds sufficient to cash pay checks for the Project, the commissary was the logical organization to perform this service. Authority was established 16 October 1944 to carry approximately \$30,000.00 for check cashing purposes. (Appendix D-27.) Arrangements were made at the same time to install an adequate safe for this money. On 12 November 1946, the amount of cash was changed to \$85,000.00. (Appendix D-28.) Checks were cashed, from the inception of the Project for Civil Service personnel, hourly employees of the Contractor, Zia Company personnel and Military personnel (See also Bk. VIII, Vol. 2, p. III-22).

(3) The following tabulation outlines the growth of Commissary sales over a two year period:

	<u>Cash Sales</u>	<u>Sales to Organizations</u>
March 1943	\$ 672.42	\$ 479.31
March 1944	20,829.20	16,612.46
March 1945	39,892.00	56,534.00
March 1946	83,000.00	10,310.00
31 December 1946	92,824.94	66,952.70

(4) After 10 June 1946, the policy of selling only to local residents was again established for it was decided that the real emergency was over and food supplies were becoming more available in local markets. Commissary cards were issued only to those living on the Project at that date.

6-4. Post Exchange.

a. The Post Exchange was activated 25 June 1943, in accordance with AR 210-65. The only facility of this kind prior to this date was an MP branch exchange for military personnel, operated under the Exchange of Bruns General Hospital. The sum of \$5,000.00 was borrowed from the Army Exchange Service, to purchase merchandise and defray current expenses until the Exchange was in position to handle its own obligations. This amount was paid back in monthly installments, the payment being made on 8 June 1944. The original exchange was composed of four operations, namely: MP Exchange, T-310 Barracks Bar, Trading Post and a General Store. The Barracks Bar was operated for the benefit of Sundt Construction Company employees and closed in December 1943 after only a few months operation. Later it was reopened as the Non-commissioned Officers Club.

b. Building T-8, known as the Trading Post (the same building used by the school), (Appendices D-13, E-66), was a small log structure with a selling space 29' x 30' and a small room in the rear. Soft drinks, beer, ice cream, tobacco, plate lunches, and hamburgers were served. It was the center of purchasing activity and much too crowded. On 10 October 1943, the entire operation was exchanged with the operations in a larger room in Building T-7, which had been functioning as the General Store, selling drugs, clothing and gift items, distributing laundry and dry cleaning, and handling mail. (See 6-47.)

c. This reversal of operations made the Trading Post, Building T-8, the General Store, which it has remained; and Building T-7 became a Service Club carrying the sundry post exchange items as well as serving

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meals.

d. The Service Club, T-7, (App. D-12, E-61) has added barber shop and beauty parlor operated by the Army Post Exchange.

e. Another Post Exchange, T-29, formerly the stone primary school building of Los Alamos Ranch School, was opened September 1944. This branch, known as the Tech PX, is located near the entrance of the Technical Area and has meals, fountain service, candies, magazines, tobacco, etc.

f. On 29 June 1944, another branch, known as the SED Exchange, was opened in Building T-242, to serve the Special Engineers Detachment with exchange items and services.

g. The Poo Wee PX was started in September 1945, serving the community by handling soft drinks, and beer in packages, and selling cigarettes, state-tax free to Exchange employees and to civilians permanently employed and living on the Post. This PX also maintained film developing service to Santa Fe, which was a convenience to residents. It further took over the laundry distribution station from the Trading Post.

h. An Appliance Store was established late in 1946, selling electrical equipment and appliances, as well as servicing radios and small electrical units for Project employees.

i. A tailor shop was set up in one of the old ranch buildings, where alterations to garments and tailoring may be obtained (Appendix E-9).

j. On 21 November 1946, the Post Exchange opened the Christmas PX. This store handled items suitable for Christmas gifts.

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included many things difficult to obtain in most cities, such as electrical and mechanical appliances, radios, luggage and similar goods and services. This operation was closed 14 December 1946.

k. In addition to the above functions of the Post Exchange office, several activities are under the jurisdiction of the Exchange. Some of these activities are let on a concession basis. All concessionaire contracts are executed in accordance with standard Army Exchange concessionaire contracts, for a period of one year, and provide that the Exchange will receive 10% of the gross receipts after deducting state sales tax.

l. The garage and filling station (Appendices D-13, E-1) is under such a contract. This station was originally a direct PX operation, but a concession was let to Mr. J. W. Miller, in August 1946. The filling station building was a small warehouse, T-61, which was later enlarged by the addition of a 4-stall garage, to care for the increased demand for gasoline, tire repair, car washing, greasing and mechanical repairs. Through 31 December 1946, this concession produced a total revenue to the Exchange of \$11,847.62.

m. Another concessionaire contract was made in July 1946 with Mr. C. K. Noel, for the Cleaning and Pressing Shop. This contract expired 21 October 1946, at which time Mr. Joseph Ferris, Mr. Phillip Ferris and Mr. Theodore Ferris, became the new operators. Before a shop of this kind was set up on the Project, all dry cleaning and pressing was sent to Santa Fe and distributed on its return through Building T-8. Increased personnel put such a burden on the limited facilities of T-8 that a dry cleaner was induced to set up his equipment in Building T-4 on a contract basis. While operated by Mr. Noel this concession produced

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\$7,175.44, and while operated by the Messrs. Ferris, through 31 Decem
1946, \$1,094.25, in revenue to the Exchange.

n. Another concession was established 11 December 1946
with Mr. A. F. Sturm, for a shoe repair shop. In the short period ex
31 December 1946, this concession produced for the Exchange revenue
amounting to \$45.93.

o. An indication of the growth of the Exchange Operati
follows:

Cash Receipts

	<u>July '43</u>	<u>Sept. '43</u>	<u>Oct. '43</u>	<u>Feb. '45</u>	<u>Feb. '46</u>
Total PX Operation:	\$8,178.17	\$22,520.64	\$21,237.37	\$92,568.32	\$100,010.12
					<u>Dec. '46</u>
					\$192,510.12

p. The labor conditions were such that proper and adequ
personnel could not be found to conduct many of the operations. Milit
personnel were used in such capacities as: WACs in the Exchange offic
and as counter girls; and enlisted men for supervisory functions, ware
house men, salesmen, and truck drivers. These positions were filled b
selecting military personnel who had the proper qualifications. In th
beginning all worked full time on their Post Exchange assignments, but
paid half their base pay in addition to the regular pay. Even when ci
vian personnel became available, it was still necessary to use military
personnel also, some in a full-time and some in a part-time capacity,
because of expansion of the Exchange operations. The total personnel
the Exchange numbered 17 in June 1943, which increased to 38 full time
military, 31 part time military and 49 full time civilians by February

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1945, and again increased to 43 full time military, 117 part time military and 145 civilians in February 1946. On 24 December 1946, the total 167 civilians, 43 full time military and 17 part time military, show a decided decrease of military and increase of civilians.

q. Security regulations at the Project prevented the Exchange from receiving the assistance normally granted by the Service Command. Consequently the Exchange Officer made all purchases direct from suppliers. No vendors were allowed to visit the Project and considerable time was spent in locating vendors who could supply the amount and variety of merchandise necessary to take care of such an isolated Exchange items were sold to civilian and soldier alike. Civilian audits made quarterly audits of the books, the first on 25 May 1944.

6-5. Los Alamos Community Association and Direct Concessional Contracts.

a. The Los Alamos Community Association was formed under AR 210-200 during 1946. Its principal functions were to handle certain enterprises through concessionaire contracts which were not included in the Post Exchange, and to use the proceeds to subsidize the library, athletic fields, a proposed swimming pool and other activities for the good of the community. A council was set up of five members. They, in turn, hired a part-time manager to arrange for bids and administer incoming funds. The roller-skating rink is an example of a concession which has been established under this program. The contract on this concession was awarded to Elton J. Bonneville, on 18 September 1946. The facilities consisted principally of a canvas tent and a wood floor, furnished by the concessionaire. A sliding scale of revenue goes to

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Community Fund from the receipts of this business, as follows:

- 5% on a weekly gross of up to \$250.00
- 7½% on a weekly gross of up to \$350.00
- 10% on a weekly gross of more than \$350.00

b. Direct Concession Contracts. - Concessions were sometimes set up directly between the War Department and the concessionaire. One instance of such an enterprise is the Los Alamos Drug Store. Bids were requested by the Operations Division and applicants were carefully checked. It was felt that the successful bidder should be qualified as a pharmacist, and should live on the Project to be available for night calls. Mr. Thurman E. Gunter was selected, and the operation of the store began 27 November 1946, in Building T-9, an original ranch house. The contract is based on the same stipulations as the Post Exchange concession contracts, namely; it provides that the War Department will receive 10% of the gross receipts after deducting the state sales tax.

6-6. Post Office.

a. Sundt Construction Company maintained a fourth class post office at the Project from the early part of 1943 until 1 November 1943, with Mr. Ray Schoen as the first postmaster. In addition to this establishment, the Post Exchange handled mail deliveries as part of the service rendered by the General Store (See Par. 6-29). It was not an authorized Post Office but acted merely as a distribution point for the residents of the Post. In addition, this operation, staffed by one WAC and three GI drivers, sold stamps and Express Money Orders for the further convenience of the residents.

b. Mail for the Military units was separated in the Post

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Office at Santa Fe and delivered directly to unit headquarters. All mail for the Technical Area was sent directly to the mail room in T Building, which was under the direction of Priscilla Greene. Substantly the same system still exists in the Technical Area, except as to Supervisor and the location of the mail room. Project mail was brought from Santa Fe by military drivers in an open weapons carrier. Three round trips were made regardless of the weather.

c. Mail service continued under the jurisdiction of the Post Exchange until 1 February 1945, when a postal officer was appointed to set up a new Post Office according to U.S. Engineer specifications. The new Post Office building was completed 10 May 1945 (Appendix D-1). The money order function was still under the Post Exchange and remained their responsibility until 1 October 1945. After this date a Money Order Unit No. 2, was established under the Santa Fe Postmaster, and money and COD packages could be handled directly for the first time. Two Army mail clerks were in charge of these funds.

6-7. Motor Transportation.

a. A Motor Transportation Pool and Shop were established about 1 July 1943. The pool at the time consisted of approximately five vehicles; prior to this time each vehicle was assigned to a specific person or group. Some few vehicles remained assigned to the Operating Contractor and were not subject to Pool Control. On the original date WACs and seven enlisted men drivers were assigned to make personnel transport and haul truck freight from railheads and airports at Santa Fe, Lamy, and Albuquerque. Below is a tabulation showing growth of the Motor Pool by personnel assigned:

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	<u>WAC</u>	<u>EM</u>	<u>Civilian</u>
July '43	2	7	
Dec. '43	5	15	
July '44	7	22	
Dec. '44	9	30	
Mar. '45	11	42	
Mar. '46	5	34	31
Dec. '46 (Zia Company)	-	-	116

b. The Motor Pool was charged with the transportation personnel to and from the Site, and the transportation of all freight from railheads and airports. The magnitude of this operation increases proportionately with the growth of the Project. Other duties of the Motor Pool were to effect the dispatching of all vehicles necessary for construction and administration of the Project. Vehicles were assigned to the Operating Contractor for the Site operation, and, at the request of the Contractor, control was exercised by him. These vehicles are now dispatched in a manner similar to that in which the central pool is operated, and they are inspected and maintained there. The following tabulation indicates the growth of the motor pool by vehicles assigned:

	<u>Vehicles</u>
July 1943	45
Dec. 1943	250
Sept. 1944	400
March 1945	650
March 1946	1,181
December 1946	1,180

The last figure is broken down into types of vehicles as fol

Sedans	177
Jeeps	125
Pickups	165
Carryalls	47
Weapons Carriers	171
Panel Trucks	12
15 Passenger Conv.	
Sedans	6
Armored Car	1
Buses	85
Trailers	78
Ambulances	13
Trucks, Miscellaneous	279
Wreckers	9
Farm Tractors	2
Fork Lift Trucks	7
Cranes	3

c. Of the total number of vehicles, some 249 are assigned to the Operating Contractor, the remainder to military detachments, hospital, maintenance crews, construction crews, etc. Prior to 1 July 1943, all freight required at the Site was hauled by commercial trucks at prevailing hourly scales. Security and economic reasons induced the project to use every effort to haul all freight with Army trucks and soldier drivers. All materials and supplies required for the Project activities were hauled initially from Santa Fe, partially over rough, steep and unpaved mountain roads, resulting in abnormal wear and tear on the vehicles. A round trip to the railhead at Santa Fe required 92 miles of travel. Since Albuquerque is the only major marketing center with reasonable distance, it frequently became necessary to dispatch trucks that point for essential supplies and equipment. Air Freight shipments received via ATC arrived at Kirtland Field, Albuquerque, representing New Mexico terminus for such shipments. A round trip to

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Albuquerque involved travel of 228 miles. The wear and tear to mechanical equipment incident to such lengthy trips was high. Since early summer 1944, the entire road between Santa Fe and the Project has been surfed thereby reducing abnormal wear and tear on the vehicles. For the first six months following establishment of the Project, two-seven-passenger station wagons were adequate to haul passengers to and from Santa Fe. Large buses, 40 passenger, have been acquired and now approximately eleven daily make the same round trip. In March 1945 and March 1946 there were approximately thirty passenger buses in daily service to numerous points within a radius of 50 miles of the Project. This figure was increased to 43 buses in December of 1946, with approximately 518 passengers making the daily round trip. No competition with commercial bus lines has been experienced since the routes travelled and schedules maintained did not coincide with any established bus line. The operation of these buses was considered necessary in the interest of obtaining essential man-power since housing facilities are limited on the Project. Such bus service is provided for laborers, mechanics, maids, etc., on a free basis, as it is the only way adequate help can be obtained. In this connection, it should be noted that approximately 60 Indian girls utilize the buses daily, incident to their employment as maids by individuals housed on the Project. The maids are not paid by the Operating Contractor nor the Government, but by the individuals utilizing their services. However, maid service was considered essential at this Project inasmuch as there is a strong suggestion that wives or adult dependents should be employed residing on the Post. Furthermore, it was imperative to conserve the health of all scientific employees. Since the Government buses are the only

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means of transportation, the policy outlined above has been adhered from the beginning of the Project.

d. On 27 April 1946, the Zia Company took over transportation, absorbing the buses, most of the heavy equipment, and the responsibility of conveying personnel and freight. The bus schedules were maintained with 43 buses making round trips to near-by towns, three buses for school children, and seven other buses operating on the Project.

e. The Post Motor Pool was transferred to the Zia Company with all staff cars and light vehicles, and, on 16 August 1946, a taxi service was installed by that company for official transportation on following substantially the same procedure as that under which the Motor Pool previously had been operated.

f. The Motor Repair Shop, established in July 1943, was initially staffed with six soldier mechanics. Previously all necessary repairs were accomplished in commercial garages at Santa Fe. By December 1944, 37 soldier mechanics were assigned; in March 1945, there were 5 enlisted men and 22 civilians, of which 26 enlisted men and 8 civilians served as mechanics, and the remainder were used for lubricating and repairing, and in the body shop, welding shop, filling station, etc. April 1946, the staff included 97 civilians and 53 enlisted men. The majority of equipment received since December 1944 has been procured in excess at Hanford, Oak Ridge, etc., and the mechanical condition has been only fair. Many items were "dead lined" upon arrival, or classified mechanically harmful or dangerous to operate until repairs had been accomplished, and the balance required constant maintenance. Very little new or rebuilt equipment was received. Because of this condition, it

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necessary to buy a considerable quantity of spare parts on the open market in order to continue operations. Ordnance sources were canvassed with little success. Only small items were purchased on the open market stock, the balance of the items being bought on emergency requisition. In order to keep the equipment operating and the Project functioning permission was granted by the District Office (see Appendix E-29) to effect these local purchases. The distance from the supply points to the Project entirely dependent upon motor transportation for supplies, subsistence, construction material, and personnel.

6-8. Maintenance and Repair. - Maintenance and repair for the structures in the community have generally been accomplished through Account crews (See Par. 5-3). These crews include all important crafts of the building trades. The normal procedure was to phone the maintenance office with a request for service. This request was then sifted for and issued to the proper trade foreman for accomplishment. Routine calls were handled according to priority need. Emergency calls were handled by crews maintained for 24-hour service. Crews were larger than those normally required for a similar installation, because of the haste of original construction and the isolation of the Project.

a. Refinishing and Cleaning Houses. - In addition to maintenance and repair, further work was necessary on account of the considerable shifting of residents in the housing area. This moving was done by Government-employed personnel using Government-owned equipment. As it was not desirable under existing security regulations to have commercial moving concerns enter the Project to do this work, this service was provided. It was also necessary to provide means for cleaning, and in some cases refinishing, vacated apartments. A crew of Government-

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employed men was used to go into vacated ^aaprtments to clean and, if sary, repaint or make minor repairs, in order to provide suitable qua for the next occupant. This was considered a part of the Government maintenance and was done without charge to the occupants.

b. Ice Delivery. - Another service, ice delivery, was established because of the difficulty in supplying electric refrigeration in all cases. Ice from the ponds in the area was cut in the winter time and stored in an ice house, for later sale to the residents of housing facilities which did not contain electric refrigeration. This project was self-supporting. After addition of the trailer area, it was necessary to haul ice to the Project from Santa Fe. Ice was delivered to trailers and other dwellings, and the occupants were billed for this service.

c. Heat. - Heat in the apartments, dormitories and duplex units is maintained by a force of sixty to seventy civilian janitors, including twenty to twenty-five wood and coal delivery men, approximately seven months out of the year. The furnace firing areas are divided into sixteen districts with a man for each district for each of two eight-hour shifts per day. Supervising these shifts have been enlisted personnel who had approximately four districts each. Considerable difficulty has been encountered because of the facts that the firemen were inexperienced, many were unable to speak English, and most of them could not work on a permanent year-round basis. For these reasons the turn-over was very large, and the problem of firing the furnaces caused considerable dissatisfaction among the occupants of the apartment buildings. However, most of the difficulties have been ironed out, and, as

whole, it is felt that the service rendered was satisfactory.

d. Garbage disposal. - Garbage and ashes were collected from each dwelling daily by Government-employed personnel with Government-owned equipment. Wet and dry garbage from family quarters is disposed of in an incinerator constructed for this purpose. Ashes are collected and used for fill or for surfacing of low-cost roads. Edible garbage is removed from the mess halls and sold to a near-by farmer hogs.

e. Self Help Laundries. - Six laundries, equipped with domestic-type electric washing machines, mangles and hand irons, are available through the areas. A superintendent, a charwoman, and a janitor are required to operate each installation. Any resident is eligible to use the equipment and is charged rental on an hourly basis. These central laundries were established because private facilities were not available. These listed services were turned over by the Government, 1 May 1946, to Zia Company for future operation under their contract. (See par. 6-1.) (Appendix E-56.)

6-9. Procurement and Supply.

a. Supply.

(1) The first property was acquired when the Manhattan Engineer District formally accepted the Ranch School on 8 February 1943. At this time, an Accountable Property Officer was set up in New York and the Los Alamos Account was carried on Memorandum Receipt from Oak Ridge. This was only for the short space of three months, however Col. J. M. Harman, was appointed Accountable Property Officer, for Los Alamos, on 1 May 1943. He set up a Division with an Accountable Prop

Section and a Property Receiving Section. Here, too, the unexpected unanticipated expansion in volume of receipts greatly hampered the section, as did the scarcity of competent personnel. Then too, the account was under the rigid restrictions imposed by Security. Consequently, normal property control measures became somewhat ineffect making it necessary to inaugurate an extension to the usual measures include the widely flung activities.

(2) The functions of the Post Supply Office include supplying the following listed services to the Santa Fe Area Site, the Santa Fe Office, Trinity Site and Sandia Base:

(a) Furnishing building equipment and maintenance supplies for both the Technical Area and the Post.

(b) Supply of military detachments.

(c) Furnishing equipment for housing.

(d) Furnishing office equipment and supplies.

(e) Furnishing motor vehicles, automotive parts and supplies.

(f) Normal Post requirements.

(g) Furnishing construction materials unobtainable by construction contractors.

(3) Accountability for government property in the hands of the War Department at Los Alamos, and under the supervision of that command, has been delegated as shown below. Accountability for property within the technical area of the same Post has not been and is not now, included in this accountability:

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<u>Name and Rank</u>	<u>Date Appointed</u>	<u>Date Reli</u>
MED, New York	8 February 1943	1 May 1943
Harman, J. M., Col., CE	1 May 1943	1 June 1943
Ashbridge, Whitney Lt. Col., CE	1 June 1943	6 July 1943
White, Edward A. Capt., CE	6 July 1943	20 February 1946
Jenike, William F. Capt., CE	20 February 1946	1 November 1946
Lefler, Verlin R. Administrative Asst.	1 November 1946	to date

(4) Property was received at a central point with receiving reports made to cover the transaction. A Stock Record Card System was set up, with receipts of property posted to the stock record cards and supported by the Receiving Report Vouchers. Issues were made to the various sections connected with Post Activities on Memorandum Receipt. Furniture was carried on Memorandum Receipt also, when issued to tenants. Issues were made on Storerooms Issue Slips, which were signed by the individual receiving the material. From these slips the Memorandum Receipt was completed.

(5) There was a certain amount of difficulty in setting up a Standard Operating Procedure, resulting from changes in applicability of different directives. The account originally operated on Chapter II, Orders and Regulations, Corps of Engineers, until May 1943 inasmuch as no directive had been issued to cover the operation. The latter part of August, Circular Letter 2398, dated 18 May 1943, (Appendix F-8) from the Office of the Chief of Engineers, was made effective and

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items with a monetary value of ten dollars or less were to be classified as expendable and accounted for as such. Another change in procedure was instituted early in 1946, and the account was operated strictly in accordance with War Department Supply Regulations.

(6) No complete property audit had been made from beginning of the Project until the Spring of 1946, when the heavy pressure of the work had been relieved and time was available for such necessary checks.

b. Procurement.

(1) Procurement was also the responsibility of the accountable Property Officer. Mr. James Harmon was in charge of Procurements until July 1943. The office was originally at the Project but the middle of 1943, it was moved to the Bishop Building in Santa Fe, Mr. Peter A. Curran in charge. It was the function of this section to review all requisitions from various Divisions. If these requests were in order, the material was sought first through Army channels and next through commercial jobbers by Purchase Order. Besides being the liaison point with these commercial accounts, it was the duty of Procurement to expedite shipments and arrange transportation.

(2) It was understood that the Procurement Section of the Operating Contractor would deal solely in highly technical and scientific supplies, but the Post Supply Officer provided all supplies considered non-scientific for the Technical Area. At times the Post Procurement received technical shipments which were sent immediately to the Technical Area.

(3) Fuels procured include coal, diesel oil, disti

and kerosene. Except for negligible quantities of coal purchases at beginning of activities to meet initial requirements, coal consumed the Project has been procured through established Quartermaster Depo that is, contracts have been executed by the Quartermaster to cover varied requirements. No unusual problems arose in connection with a adequate supply of coal for domestic and technical use, since local mines produced coal meeting detailed specifications and all procurement activities in this connection were accomplished in accordance with established Army procedure. Large quantities of diesel fuel were provided for the operation of the local power plant. All such procurement was made under appropriate Treasury Procurement Schedules and all activities was in accordance with existing rules and regulations. Substantial quantities of distillate and kerosene were procured. Equipment burning these fuels has proved far more efficient than similar coal-fired heat equipment and consequently more of these fuels has been purchased in successive years. In early 1945, it became a policy to purchase oil-burning rather than coal-burning equipment for domestic and technical partially because of longer hauls in obtaining necessary coal.

6-10. Police and Fire Department.

a. Police Department.

(1) Military Police. - When construction was begun civilian guards were assigned to internal security and remained until first military personnel arrived to assume guard duty late in April 1945. The Military Police unit assigned to guard duty had been organized at Ft. Riley, Kansas, in March and designated as Provisional MP Detachment No. 2. The original strength was 196 men and 7 officers, all of whom

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met overseas requirements and volunteered for that type of assignment. Soon after assuming the guard responsibility, the detachment was divided into four patrols of approximately 35 men each. Each patrol was on duty for 8 hours and off duty for 24 hours. The Sergeant in charge of each patrol acted as Commander of the Guard and one officer was designated Officer of the Day. The Commander of the Guard was the only roving commissioned officer. This system was later revised to have an officer assigned to each patrol as Commander of the Guard. Privates were designated as jeep drivers to roam the Site. The unit had been organized with a mounted section, with the expectation that mounted sentries would be required. As many as six mounted posts were in effect from time to time, but they were found to be impracticable and the last was abandoned in January 1944. After that, the 134 horses were used only for periodic patrols and recreation purposes. These horses were gradually reduced in number by disposal and transfer until no more remain. From May 1943, until the end of the year, half of the guards on duty were posted inside the Technical Area, guarding special buildings and the incomplete fence line. As construction neared completion, sentries were removed from inside the Technical Area and two perimeter foot patrols plus gate guards replaced them. A fire guard with a time clock system was on duty at night inside the Area. Construction at new sites, beginning in July 1943, required additional MP personnel. On 4 September 1943, 99 additional men were assigned to the Detachment. The eight hour duty-tour continued through the winter of 1943-1944. This tour proved too long for alert duty and on 10 April 1944, the guard personnel were reorganized into 3 patrols which began a 24-hour duty system. Privates were posted

for 2 hours duty and off for 4 hours. Non-commissioned officers work six hours and rested six hours for their period of duty of 24 hours. During the summer of 1944, 25 escorts were required to accompany un-cleared workmen inside the Technical Area. This made it necessary to reorganize the guard into two patrols working for 24 hour periods alternately. Since the fall of 1943, the patrols have been subdivided into two sections, each under a section Sergeant equipped with a radio vehicle. The Commander of the Guard and his assistant, a Staff Sergeant each were equipped with a radio vehicle. The Officer of the Day and Commander of the Guard constituted the officer personnel. With the increase in the Project, the authorized strength of the Detachment has also been increased until it reached 486 men and 9 officers. On 31 December 1946, the guard was manning a total of 44 full time posts, requiring 115 men every 24 hour period. In addition to the regular guard, escorts for construction then in progress required the use of approximately five extra guards per day. Total strength of the MP Detachment approaches 500.

The Military Police, under the supervision of the Provost Marshal, have constituted the primary law enforcement officer of the Project. The Motor Patrol Section has patrolled the roads, apprehended traffic violators, issued summonses for appearance before the court, and testified in resultant proceedings.

(2) Community Law. - Until July 1946, law enforcement of civil nature was largely a matter of community cooperation. If the violator admitted the offense, he was permitted to pay a stated fine which was disposed of for the Community through the Town Council; if

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plea was "Not Guilty" the individual was requested to appear before Town Council (Par. 6-15b) where, if found "Guilty" he was asked to pay the same stated fine for his violation. The jurisdiction was granted voluntarily on the part of the alleged offender; in other words, whether or not he paid the fine was a voluntary action and legal measures could be brought to bear.

(3) U.S. Commissioners Court. - On 7 July 1946, necessary arrangements were made for trial of civil petty offenses before United States Commissioner, Hon. Albert T. Gonzales, designated on 2 June 1946, by U.S. District Judge Colen Heblitt, to try such cases. A court was established outside the Project boundary, to ensure that the trial is public. Authority to hold court at Los Alamos was granted with the knowledge and approval of Everett M. Grantham, U.S. Attorney for District of New Mexico, to provide a means of punishing petty offenders. Under Section 541, Title 18, United States Code, petty offenses are defined as all offenses the penalty for which does not exceed confinement in a common jail, without hard labor, for a period of six months, or fine of not more than \$500.00, or both.

By way of statistics the following figures were made available by Commissioner Gonzales and Capt. Harry Wise, Provost Marshal:

Offenders arraigned, July 10 - Dec. 31, 1946	7
Convictions on above with resulting fines	6
Acquittals or dismissals	1

Traffic violations have constituted approximately 95% of all offenses, while the remaining 5% have constituted such violations as simple assault, breach of peace, and disorderly conduct. More serious offenses are tri

before the U.S. District Court Judge, but arraignment can be made before the Commissioner.

b. Fire Department.

(1) Prior to 1 April 1943, fire protection was provided by the construction contractor (See also Bk. VIII, Vol. 2, p. III-38). It consisted of one rented fire truck, equipped with a booster tank of 150-gallon capacity and a few tools. Some 135 portable water tank extinguishers, pump type, were furnished to him for distribution in completed buildings. During March 1943, the Project received two Class 500 pumper fire trucks, each with standard equipment, including 2,000 feet of 2½-inch hose. On 1 April 1943, one fire chief, Edwin Brooks, and six firefighters reported for duty, thus relieving the construction contractor. These firemen were all civilians and, with their families, were assigned to apartments in the area. The fire station had no quarters for personnel. In August 1943, a Class 300 brush fire fighting truck was acquired. In early October 1943, the civilian firefighters, except the chief, were replaced by nine enlisted men. Quarters had been constructed at the Fire Station and the change was made primarily to relieve a critical housing shortage, as well as to increase control of personnel.

(2) From 1 April through 31 December 1943, the Fire Department answered 27 alarms classified as follows:

Building Fires	8
Brush Fires	5
Asphalt Kettle Fire	1
Vehicles, private, Fires	3

Furnace calls, no fires	8
Standby for trash burning	1
Demonstration	1

(3) Estimated fire damage to Government property \$380; to private property, \$765. During 1944, the personnel was increased to a maximum of 14 enlisted men. On 19 June 1944, Fire Station No. 1 was commissioned and located in the vicinity of Anchor Ranch outlying site. It was manned by one sergeant and 4 enlisted men and was supplied with the class 300 brush truck from Station No. 1. Later a 3/4 ton weapon carrier equipped with back-pack water fire extinguishers and forest fire fighting tools was added. However, the brush truck had only a two-wheel drive, hence the nature of the terrain restricted its usefulness. A trade was arranged, on 4 November 1944, with Bruns General Hospital at Santa Fe, for a truck of the same classification but with four-wheel drive. On 8 December 1944, a Class 325 Brush fire fighting truck with four-wheel drive was acquired for use at Station 2 to handle an increasing number of brush and forest fires caused by operations at the site. Particularly because of the combustible construction at the site, there was an appreciable possibility of having two or more alarms at one time, and a Class 750 pumper-type fire fighting truck was acquired on 11 September 1944 for protection against this hazard.

(4) During 1944, Station No. 1 answered 61 alarms, classified as follows:

Building Fires	17
Hay fire	1
Brush fires on Post	3

Brush fires at Site	5
Vehicles, private, fires	2
Vehicles, Government, fires	1
Lumber shed fires	2
Furnace calls-no fires	25
Standby, at sites	1
Covering station No. 2	1
Oil tank fires (one false)	2
Practice Alert	1

(5) Estimated damage to Government property was \$4,253; to private property, \$9,000. Of this later estimate, \$8,875 was the loss of a truck and load of electrical equipment about five miles from the town site.

(6) During 1944, Station No. 2 answered 65 alarms classified as follows:

Building fires	1
Trash fires	1
Forest and brush fires	39
Pumping out flooded steam pits	6
Investigations after fires	9
Stand-by at site operations	9

Estimated damage to Government or private property was nil. In addition to fire fighting, Station No. 2 delivered 154,265 gallons of water to the various sites.

(7) Between 18 May and 15 June 1944, under supervision of the Forest Service, the Fire Department controlled the burning of

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about 10 square miles of brush and forest land covering the area used and to be used at the outlying sites. This operation necessitated 24 hour patrols, supplied mainly by the Military Police Detachment. During 1945 the Fire Department was enlarged to include a Chief (civilian), three Deputy Chiefs (military) and forty-three firemen (military). The equipment consisted of the two Fire Stations and twelve pieces of mobile apparatus as follows: In Station No. 1, a 750 gallons per minute triple combination engine, three 500 gallons per minute coordination pumping engines, and one brush truck rated at 300 gallons per minute; and in Station No. 2, one 500 gallons per minute triple combination pumping engine, 5 brush trucks, and one weapons carrier. The number of fires for both stations during 1945 was 379, divided as follows:

	<u>Station #1</u>	<u>Station #2</u>
Chimney fires	12	0
False Alarms	17	1
Wooden Shed fires	4	1
Brush fires	14	172
Hot furnace calls	55	0
Garage fires	2	0
Rubbish fires	14	19
Sawdust pile fire	1	1
Unnecessary alarms	14	2
Oil truck fires	1	1
Electrical fires	2	6
Explosions	1	0
Defective alarm system	6	0

Oil stove fires	3	0
Trailer fires	4	0
Structure fires	15	6
Vehicle fires	<u>4</u>	<u>1</u>
	169	210

(8) "Unnecessary alarms" are those turned in when persons think it necessary to call the Fire Department but no fires. "False alarms" are turned in deliberately and often maliciously by persons who are well aware that no fire exists. These are arbitrary terms used by the New York Fire College, Long Island City, N. Y. The 1945 estimated fire damage to Government property was \$148,790, of which \$124,700 was "C" Shop; private property damage was estimated at \$4,500.

(9) On 13 August 1945, a large new central fire station, now known as Station No. 1, was completed and put into operation. This new structure (Appendices, D-13, E-51) replaced the old Station No. 1, (Bldg. T-25). A practice tower and a hose drying tower were erected adjacent to this structure. The equipment and apparatus attached to Station No. 1 was shifted to the new operation, and, in addition, two new 500 gallons per minute pumps and two 750 gallons per minute pumps were acquired, with 5,000 feet of 2½-inch hose, 3,000 feet of 1½-inch hose, new fog nozzles, six 300 gallons per minute brush trucks (4 x 4), one 300 gallons per minute brush truck (2 wheel drive), 5,000 feet booster hose.

(10) As of December 1946, the personnel had increased to one chief, two assistants, and 90 military firemen. The apparatus and equipment consisted of the above mentioned additions as well as:

- 3 750 gallons per minute pumping engines
- 4 500 gallons per minute pumping engines
- 12 300 gallons per minute brush trucks
- 1 300 gallons per minute weapons carrier
- 4 700 gallons per minute trucks
- 1 750 gallons per minute crash truck

(11) The department is also equipped with six mobile radio cars and two fixed stations - one in each fire house.

(12) There were 411 fire calls during 1946 which are classified as follows:

	<u>Station No. 1</u>	<u>Station</u>
Chimney fires	1	0
False alarms	46	0
Brush fires	42	179
Defective heating equipment	16	1
Vehicles	15	2
Rubbish fires	6	0
Unnecessary alarms	4	0
Unknown	5	2
Electrical	9	0
Overheated equipment	7	2
Asphalt Spreader	5	0
Sparks on roof	5	0
Sawdust	3	0
Cigarettes	10	0
Classified material	5	0

False sprinkler supervisory	39	0
Miscellaneous	3	0
Stand by alarms	<u>4</u>	<u>0</u>
	225	186

(13) All community structures are equipped with portable extinguishers; the totals as to types are tabulated below:

Water extinguishers	1811
Soda-acid type extinguishers	1000
Foam type extinguishers	996
Carbon dioxide type extinguishers	1800
Carbon tetrachloride type extinguishers	<u>1200</u>
Total	6807

(14) In April 1946 a Fire Prevention Section was organized, employing twenty-five persons whose duty it was to check for hazards and fire equipment, maintain fire extinguishers, and educate employees in fire prevention.

6-11. Medical, Dental and Veterinary Service.

a. Medical Service.

(1) In accordance with instructions received from Laboratory Director, the Operating Contractor hired Dr. Louis H. Hempelmann and Dr. James F. Nolan in the latter part of February 1943, and shortly thereafter, three civilian nurses, Sarah Dawson, Harriett Petersen and Margaret Schoppe, to care for the general health and well of the personnel at Project "Y". Dr. Hempelmann and Miss Petersen have remained at the Project since that time. The preliminary arrangements

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were made orally through personal conference among Dr. Oppenheimer, Laboratory Director, and Doctor Hempelmann and Doctor Nolan. The duties of the physicians included the protection of personnel from industrial hazards and general medical care of the residents at the Project. Specifically, the two physicians were hired with the first duty in mind, since both were trained along these lines. Dr. Hempelmann had trained in internal medicine in radiology; Dr. Nolan had trained in obstetrics, gynecology and radiology. As a general plan, Dr. Hempelmann was in charge of industrial hazards and Dr. Nolan was in charge of general health, and each assisted the other. It was at first thought that both Doctors would be commissioned in the Army, but this procedure was changed because of changes in the nature of their work. Dr. Nolan was commissioned a First Lieutenant in June 1943, and, as Project Surgeon, was directly responsible to the Commanding Officer of the Project, in military channels, for medical care of the personnel, and for the maintenance and supply of the medical facility. His military rank also made possible a more effective liaison between personnel of the Project and Burns General Hospital, Santa Fe, New Mexico.

(2) Dr. Hempelmann was soon fully occupied in consultation in the scientific program and could not assist in the practice of medicine.

(3) The Doctors arrived in Santa Fe on 25 March 1943, at which time the Site was not yet inhabited. During early April the two doctors and the three nurses assumed their responsibilities in a five-bed industrial-type infirmary. Full equipment was not available until several months later. Even though the Project was supervised by the Army, the medical facilities were originally considered a function of

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the Operating Contractor. An arrangement in late February 1943 was made, through the Surgeon General, with Bruns General Hospital (Appendix D-30) so that all civilians and their dependents residing at Project could receive full medical and dental care from this source. Bruns General Hospital is located about 50 miles from the Site over what was then a rather tortuous road. Despite this arrangement, car Project residents at Bruns General Hospital, or by private physicians was discouraged for security reasons. Residents were encouraged to medical aid at the site, without charge, in order to prevent traveling outside the area.

(4) The military personnel were originally cared for by 1st Lt. J. J. Horowitz and a staff of seven enlisted men. A three-bed Army infirmary was available at Los Alamos, for use of all military personnel. Cases severe enough to warrant hospitalization were sent to Bruns General Hospital, Santa Fe, in accordance with Army procedure.

(5) The original plan of hospital procedure was in the main an oral and tacit arrangement. Subsequently, there were changes in the technical program and also in security arrangements. These necessitated changes in the medical functions. The staff was soon found to be much too small for the increasing population. A pediatrician, 1st Lt. H. L. Barnett, was added to the staff in July 1944. In the beginning, the hospital maintenance was done by two untrained Indian boys, who were found to be incompetent, and, since civilian medical orderlies could not be obtained, eight medical enlisted men were borrowed from a detachment working under Lt. Horowitz. Since this time, medical order

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and technicians have been supplied from Army personnel.

(6) In the fall of 1943, Capt. Horowitz was transferred; and Lt. Paul O. Hageman, a specialist in internal medicine, was added to the staff in January 1944, to replace him. In June 1944, a plan was initiated and approved for the expansion of the larger infirmary Station Hospital classification (App. D-13, 31, 32, B-1). This was completed in the fall of 1944. With this arrangement, the military infirmary was still used for the Army sick call, but, because of the lack of nursing supervision, Army personnel were hospitalized at the larger installation. Lt. J. E. Brooks and Lt. A. M. Large, specialists in nose and throat and general surgery respectively, were procured during the latter part of 1944, in order to provide a medical staff with specialists in each of the five major fields. An administrative officer, 2nd Lt. C. M. Berg, was also added to the hospital at this time. From the middle of 1945 through 1946, the staff of doctors, nurses, and technicians was materially increased. Mrs. Darol Froman was the first pharmacist but worked only part time. A full time pharmacist and an X-Ray technician were attached to the group in May 1944, and a dietitian was added December 1945. (Appendix B-1.) Medical care is provided for all residents of the Project. Emergency treatment is given to all non-residents of the Project who have accidents on the Site. The Construction Contractors and their Sub-Contractors are charged for emergency medical treatment according to established rates on file at the hospital. All civilian in-patients are charged one dollar per day subsistence in accordance with AR 40-590. All collections are made through the Finance Section, including the subsistence charge and the fees charged to the

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Contractors.

(7) In June 1946, the hospital operating procedure was changed to the cost-plus-fixed-fee contract basis under Zia Compensation Charges for non-job incurred accidents and illness were initiated at this time. At the end of December 1946, the total hospital bed capacity was 107.

(8) The sanitary aspects of the public health functions were under Army jurisdiction, with the Project Surgeon acting in an advisory capacity, until June 1946, when the Zia contract took over the work. Functions under this system include water supply, sewage and garbage disposal, fly and other pest control. Mess hall inspections, routine examination of food handlers are carried out by the medical staff. Aside from public health measures, the population has been given a program of immunization against typhoid, tetanus and small pox. There is a school program which includes daily examination of children, immunizations, health and first aid lectures.

(9) Initially, communicable diseases were not reported but later they were reported through military channels to Oak Ridge. However, if individuals with venereal or other communicable diseases left the Project without treatment, they were reported directly to the Director of Public Health in Santa Fe.

b. Dental Service. - The original policy was to have a dental officer from Bruner General Hospital come to the Los Alamos Project two or three days a week to care for emergency and regular appointments. A regular dental office had been built in the hospital here, equipped

with three units. Lt. Richard Mosgrove was the first officer from Bruns. Later Lt. Gerald Bigelson from Bruns was offered permanent assignment here which he accepted in March 1944. He was the only dentist until 23 December 1944, when Capt. Nathan Peretzman came. The staff increased to three in September 1945, with the addition of Capt. H. Belgorod. Dental care was given not only to all military and civilians at Los Alamos, but also to those from Sandia who required it. At first these cases came up from Sandia, but as that installation grew, one of the dentists made several weekly trips to that point to handle appointments. The equipment and supplies were all standard army type. Requisitions were handled through the Project Medical Supply and, in turn, procurements were made from Medical Depots. No difficulty was experienced in getting supplies, but delay was involved because shipments were often not made direct because of security. The present staff (December 1946) is made up of four civilian doctors, three of whom were here in the Army. (Appendix B-1.)

c. Veterinary Service. - The Veterinary department at Los Alamos was organized in April 1943 as part of the MP Detachment. The original duty of this organization was to care for all animals on the Project (as many as 134 horses and 15 war dogs were used at one time, in connection with guard duty, in addition to the numerous pets and mounts owned by residents), and to inspect all foods of animal origin, including milk. Lt. R. E. Thompsett (later Capt.) and Sgt. James Mattox comprised the first staff, which increased in March 1944 to the one officer and three enlisted men, all qualified in veterinary work. A detailed picture of the functions of this department would include: care of army mounts

dairy inspection throughout this area to insure proper standards for milk, candling eggs, daily inspection of meats, control of contagious diseases in small animals, care of animals used in experimental work treatment of civilian-owned animals, and reports and administration.

6-12. Intelligence and Security. - The Intelligence and Security Office of the Project began operation in April 1943, with the arrival of the first Intelligence Officer, 2nd Lt. Curtis Clark. At that time the office had only two military members but, with the growth of the Project and the expanded security program, the office was gradually enlarged, having 28 military members and 7 civilian employees in March 1945; 11 military members and 18 civilians in April 1946; 84 military members and 48 civilians in December 1946. (For description of the administration of security among the scientific personnel, its coordination with the military, and the over-all direction, see Bk. VIII, Vol. 2, p. I-5.)

a. Security. - The security of the Project includes the operation of the pass system, visitor control, and the guard system, including shipments, personnel, materials, and mechanical guard installations:

(1) The pass system is designed to prevent unauthorized entry to the Project. The system is simple in operation in order to avoid confusion, but effective as to purpose. In order to facilitate the flow of materials and construction workers, construction contracts and designated employees of the U.S. Engineer Warehouse in Santa Fe have been authorized to sign carrier and construction employee passes. To expedite the admission of new arrivals to the Project, a pass office was established in Santa Fe, which was also used as the Project bus terminus.

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Prior to the end of the war, the only persons permitted to visit the site were those who came on Project business, whose presence at the site was necessary to the conduct of such business, and for whom permission was obtained from the Director or Personnel Director after authorization was first obtained from the Security Office. New friends and relatives are permitted social visits. Technical employees of the Project are permitted to visit other Projects, laboratories, universities, and scientific personnel, but only on authority of the Director and after clearance for the visit has been obtained from the Security Office.

(2) The Guard System. - The principal aim of the guard system, as executed by the MP Detachment, is to provide the maximum security with the minimum of manpower, correlated in such a way as to expedite rather than retard the work of the Project. Main guard posts are established at the two entrances to the reservation and at the three entrances to the Technical Area, with others located at the outlying sites. As an additional security measure the entire Technical Area is enclosed with a mesh-wire fence, on which an automatic alarm system is installed. Internally, the pass system becomes an integral part of the guard system. Passes are classified as "Project" or "Technical" area passes, and appropriate badges are issued in addition to the permanent pass, and are worn at all times in the respective areas. Badges of one color and design are issued to staff members, group leaders and other key personnel in the Technical Area, and to key military personnel, which entitle them to admission to certain areas upon presentation of proper pass. Badges of another color are issued to non-key members of the technical group, construction employees in the Technical Area

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and clerical employees. As the work of the Project progressed, various test sites were constructed, each being operated by a different group within the Technical Area. A visitor list is set-up for each site and only those persons appearing by name and badge number on the visitor are permitted to enter the site. Guards for classified shipments from the Project are supplied by the Security Office as are couriers for documents, convoy guards, etc. All arrangements for meeting, delivery and safeguarding incoming shipments are handled by the Security Office. For the protection of certain key military and civilian personnel of the Project, armed guards were furnished by the Security Office. Members of that group have been accompanied by an armed representative of the Security Office on all trips away from the Project. To conceal the identity of certain key personnel a system of code names and numbers was set up for their use. Automobile registrations, drivers' licenses, income tax returns, insurance policies, food and gasoline rations, etc. for these persons were handled by the Security Office by the use of code names and numbers, with no disclosure as to true identities. Mail of these persons was sent and received by an indirect route in order to conceal their actual location. All technical and scientific operations at the Project which involved the use of special materials were under direct supervision of the Security Office. A special detachment for this purpose is composed of military and civilian guards. These special materials are placed under continuous armed guard supervision, inasmuch as their loss would be enormously expensive and delaying. Security installations include a 9'-6" high woven wire fence, with two barbed wire strands, surrounding the Technical Area, which is in turn enclosed in

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similar fence surrounding also the Community Structures. A few similar fences surround outlying sites. A peep-proof board fence surrounds Anchor Ranch gun site and also "V" site. Some 159 flood lights, 150 watts, are mounted to light the vicinity of the technical area. In addition to these precautions, a prowler system was installed on the fence surrounding the Technical Area and on another small fence surrounding building T-412. Unusual mechanical vibrations in the fence caused by an intruder produced an audible signal in a loud speaker, and a visual signal in a circuit light, either of which could attract the attention of the sentry on duty. The system was not satisfactory, as the least vibration, such as a strong wind, set up the signals, causing more confusion and trouble than good. Consequently it was not used after January 1945 and was finally removed entirely in May 1945.

b. The Intelligence Section of the office is primarily concerned with safeguarding classified information, and the investigation of prospective employees. It was always a basic policy of the project that everyone working on the Project should have access to all information required to do a competent and expeditious job. This created the problem of educating each employee to maintain silence regarding work, and the Project. Each employee of the Project is given a detailed Security lecture by an Intelligence Officer, in which he is informed that all information concerning the Project is classified information, dissemination of which is an offense punishable under the provisions of the Espionage Act. Each terminating employee is given a similar lecture. All members of the Special Engineer Detachment are given similar lectures. All Project personnel, both military and civilian, are cleared by the

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Security and Intelligence Office prior to assignment or employment, procedure often requiring much time. This clearance includes both a ministrative and G-2 approval. Transfer of employees to the Project from other MED projects could be made only by authority of the Commanding General upon petition by the Director. Because restrictions were rigid in other phases of personal freedom at the Project, the rumor started (based, perhaps, on the evidence that a few letters to individuals had been opened through error) that unannounced censorship was in effect. This rumor grew to such proportions that General Groves ordered an investigation which, of course, indicated that no action of this kind had been taken. However, since the issue had arisen, it was deemed advisable in further safeguarding classified information to institute censorship. Thus the rumored censorship became actuality when Dr. Oppenheimer approved the measure. Censorship of all mail was instituted in December 1943 and ceased shortly after the end of the war. This function was organized under the provisions of paragraph 3d of War Department Training circular No. 15, dated 16 February 1943, which provides as follows:

"d. When the military authorities deem it necessary in the interest of security, military censorship may be effected over all communications entering, leaving, and within any area, or to or from any personnel, under military jurisdiction within the continental limits of the United States."

(See also, Bk. VIII, Vol. 2, p. III-13.)

Censorship was conducted at a point outside the limits of the Project, by trained censorship officers, in strict accordance with

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Army Regulations. Only Official mail was exempt from censorship, and all Project personnel - military and civilian - were advised that per communications were being censored. For this same purpose, limited monitoring of long distance telephone calls was conducted under the supervision of the Security Office, and all incoming and outgoing telegrams and teletype messages were reviewed. Instructions were given by the Security Office as to the classification of documents and as to the handling of these documents and materials. A system of code word was instituted for use in this connection. Vacations and pleasure trips by Project personnel could be taken only on authority of the Security Office. Families of Project employees were not permitted to reside in the city of Santa Fe, or in any other town within a radius of forty miles of the Project, nor could Project employees receive visitors.

6-13. Liaison (With Other Agencies). - Relations with outside organizations, primarily the State of New Mexico, have always been extremely cordial. This was of great importance because, in order to insure security, many unusual requests have been made, relating to compliance with State Laws, such as obtaining drivers' and automobile licenses and payment of State income tax. Since the names of a great number of Operating Contractor's employees could not be disclosed, the Commanding Officer agreed with the State that information would be available in Project Headquarters at any time it was needed, and the State thereupon issued licenses and accepted income tax forms on the basis of numbers place of names. At the time Ration Book #3 was issued, in the fall of 1943, special arrangements were made with the Rationing Board of Sando County, whereby the books were issued at the Project and the applicati

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were kept on file at headquarters, to be available only should some circumstance arise that would make it necessary for the County of Sa to refer to them. An attempt was made to work out a satisfactory ar ment for Project residents to vote in the 1944 Presidential election however, this did not succeed, because the personnel lived on the Fe Reservation, and only those employees could vote who had retained residence in other states and were able to secure absentee ballots. This was an unfortunate situation especially because the State of New Mexico in accordance with the Buck Act still expected all employees to pay State Income Taxes.

6-14. Morale.

a. Religion. - Religious services were arranged for personnel shortly after the Project started. The influence of the early Spanish occupation is seen in the strength of the Roman Catholic Church in the State of New Mexico. The Roman Catholic Cathedral in Santa Fe made arrangements to send a priest to the Project for Sunday Mass. Other services, including Mormon, Baptist, and Methodist, were held in various homes. In the spring of 1944, the Ministerial Association of Santa Fe (Protestant Churches) arranged to provide a Protestant clergyman for services at the Project. These clergymen took turns and visited the Project as their own parish schedules permitted. This was not a satisfactory arrangement because these services were scheduled on very short notice and during irregular hours. There was an obvious need for a regular clergyman who could provide his full services. An Army Chaplain, Capt. Mathew Imrie, (later promoted to Major), of Protestant faith, reported for duty 9 August 1944. He immediately scheduled Protestant

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services and began a study of community needs. In the next month Protestant Sunday Schools and Hebrew Sabbath Services were initiated. The three religious groups, Roman Catholic, Protestant, and Hebrew provided regular opportunities for formal worship. The Chaplain was given an office in the Big House, Building T-109, and was available for consultation. Major Marie was succeeded by Capt. Kenneth Ames in Aug 1946.

Under the Chaplains Office, the following church organizations were established: Choir and Glee Club, Church Council, Ushers, Women's Church Guild, and Altar Guild. Calls and visits were made within the Project and to Bruns General Hospital. The Chaplain's community activities included work with the Boy Scouts, Girl Scouts, Par Teachers Association, National War Fund, Annual T.B. Christmas seals sale, Athletic Programs, and assistance to the Red Cross Field Direct. He was chairman of the Youth Council, whose seven members, managed the Youth Center, Youth Library, and playground.

b. Educational Facilities for Military. - As Post Information and Education Officer, the Chaplain acted as advisor to the Military Detachment Commanders and lectured to enlisted personnel on various subjects. The United States Armed Forces Institute courses, texts, and material were charged to the Chaplain's office until the first part of September 1946, when this function was shifted to the Special Services Officer. Under this program graded tests of high school and college level were given, resulting in many of the military receiving high school diplomas, or certificates of satisfactory scores for presentation to Universities. Regular night school classes were formed which were held

four three-hour periods per week. Student enrollment reached a peak of 250, for which 15 instructors were utilized.

c. Recreation.

(1) Organized recreation was started 6 February 1943 under the direction of Mr. Jerry Pepper, a former teacher at the Han School. The facilities already established for the school use continue to serve, namely: five tennis courts, a football and baseball field, a ski run, and an ice skating pond. Two outlying camp sites, Camps Hamilton and May, were transferred with the school facilities and were available for camping trips.

(2) On 15 November 1943, recreation became an Army function under Special Services. Under the new regime, four additional tennis courts, four soft ball fields, a make-shift golf course (since abandoned and being replaced by an 18-hole course), and a bowling alley were added.

(3) The residents themselves did much in organizing groups, which include: Women's Club, Boy Scouts, Cub Scouts, Girl Scouts, Brownies, Spanish Club, Home Arts Club, Dramatic Club, Mountain League Baseball, Arts and Crafts Club, Sketching Club, Chess Club, Singing Group, Basketball Leagues, Ski Club, Community Welfare Association, Zia Employees Association, Mesa Club, Officers Lounge, MCO Club, Veterans Club, Little Theatre Group, Camera Club, Pottery Group, Victory Garden Group, Women's Softball League, Civilian Air Patrol, Fencing Group, Rifle and Pistol Club, Bowling Leagues, and Touch Football League. In addition to these activities, dance bands and dances, art shows, tennis tournaments, golf tournaments, monthly musicals, bingo games, Christmas

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pageants, track and field meets, lectures by local authorities, etc. have been scheduled. USO shows were not used for military entertain because of security regulations.

(4) Two theatres, T-3 and T-376, supplement the recreational facilities. Theatre No. 2, located in the central area is equipped with a basketball court, and is used for a school physical education building. It has a screen and stage for various activities such as movies, plays, dances, concerts, conferences and addresses. was the meeting place for the Colloquia, a Tuesday night conference of all staff members of the Operating Contractor. Theatre No. 1, is small and is used almost exclusively for movies. (Appendix E-65, shows Theatre No. 2).

(5) A small radio station was started 24 December 1946 to give extra entertainment to Los Alamos residents. Because of security restrictions, it was limited in power and could not be heard beyond the Project boundaries. The programs consisted mostly of recorded Los Alamos talent, news reports, and lectures.

6-15. Miscellaneous Subjects.

a. Congressional Inquiries. - Two inquiries from Senators of the United States asked for information pertaining respectively to alleged destruction of serviceable Government property and to discrimination against housing of employees of Spanish ancestry. A careful investigation revealed that the claimed destruction of Government property involved furniture of old and obsolete description, which would have cost the Government more to renovate than replace. The total estimated cost of items was \$2,680, and component parts were salvaged or reclaimed.

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from some of them. Proper Army procedure for ridding the Government these useless articles was followed. The individual who initiated the inquiry, by complaint to Senator Fennis Chavez, was interviewed by proper authority; it was found that he had never visited the site of the Project and that he refused to identify the individual who had wrongly informed him. The inquiry regarding housing discrimination was addressed to the Secretary of War by Senator Hatch and referred to General Groves for investigation. The investigation revealed that an influx of professional employees of the Operating Contractor had forced new construction of housing units of a lower cost type, and that several families of janitors and carpenters, both of English and Spanish ancestry, had been moved from the new type units to make room for these professional employees. No racial discrimination was involved, because many more Anglo civilian and Officer employees were living beyond the Project boundaries and were forced to commute as far as fifty miles to work. A result of the inquiry was to increase the size of some of the new housing units, to accommodate the abnormal size of several of the families involved. Numerous inquiries have also been received from Congressional Representatives asking that certain soldiers be discharged from the Army for reasons of dependency or necessity to National Defense. In all cases these inquiries have been investigated and, in cases where discharge has been applicable, prompt action has been initiated.

b. Town Council. - The Town Council was formed in August 1943, by joint action of the Commanding Officer and the Project Director (See also Bk. VIII, Vol. 2, p. III-10.) It was established as an advisory council of six members, elected for six month terms, from adult

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Project residents. It is charged with the responsibility of discussing problems affecting the community welfare, and of communicating its findings and recommendations to the Administration. It has the wider responsibility of maintaining in the community a spirit of cooperation directed toward a single objective, the efficiency and success of the Project. These aims were formalized in a constitution proposed by the Council and accepted by the Commanding Officer in April 1944.

Since its initial meeting, the Town Council has discussed and made recommendations upon a large number of matters affecting community administration and welfare. Most of these matters have concerned minor administrative problems, such as PX and mess hours, policy on housing assignment, traffic control, licensing and control of dogs, etc. The Council has sponsored or supported a number of community activities, i.e., Bond and War Fund Drives, fire prevention, organized recreation, Victory Gardens, etc. Among recommendations which have been acted upon none has involved major expenditures. The most important items involving some expenditure, for which Council recommendations are at least partly responsible, are: (1) the help-yourself laundries; (2) extra storage space for apartment dwellers; (3) children's play area and other children's recreational facilities; (4) an increase of floor space in one-bedroom McKee apartments over original plans; (5) lowering of rent for efficiency apartments; (6) adjustment of rentals to make these based on monthly salaries of the Operating Contractor comparable to the rentals of Civil Service employees working for the Army Administration.

c. Labor Recruiting.

- (1) In January 1943, U.S. Engineer Office, P.O. Box

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1539, under the Manhattan District, was established in the Bishop Building, Santa Fe, New Mexico. For security reasons, the Santa Fe Area Engineer of the Albuquerque District personally recruited and interviewed all key personnel for the service installation, usually employees with a very good service record within the War Department, could be made available for transfer. Employment and interviewing was then continued, in February 1943, by the Civilian Personnel Chief and four assistants, obtaining graded employees by transfer through other government agencies whenever possible, or through the Civil Service representative. Positions were established in accordance with the Classification Act of 1923 as amended.

(2) The main source of recruitment of skilled and unskilled hourly employees was through the U.S. Civil Service Commission and the U.S. Employment Service (War Manpower Commission).

(3) Payment of construction employees was in accordance with the Davis-Bacon Act of 30 August 1935 for this area (Appendix D-33), and payment of Maintenance Hourly employees was in accordance with the Wage Schedule for the New Mexico Area, approved 1 October 1944, by the Wage Administration Board, Washington, D. C. (Appendix

(4) Because of the rapid growth of the Project, and the increase to approximately 1700 Civil Service employees in March 1945, the Personnel Section was increased to twenty employees. A peak of approximately 2600 Civil Service employees was reached in March 1946, which has been reduced to 419 in December 1946. The sharp decline of Civil Service employees was caused by transferring these employees to the maintenance contractor (Zia Company), who assumed responsibility for

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late April.

(5) The coordination between the U.S. Engineers, Civil Service Commission, and the War Manpower Commission was very successful, as proven by the filling of the large requisitions for personnel required by the Project. When the local U.S. Civil Service or War Manpower Commission representatives were unable to fill requisitions for skilled mechanics, they were very cooperative in getting immediate interstate clearance, and the afore-mentioned agencies were also helpful to Engineer representatives during recruitment in other States.

(6) The only labor problem with Civil Service employment was the opposition of organized labor to non-organized labor on this Project. During the month of November 1944, an officer from the office of Chief of Engineers, Washington, D. C., the Director of the 13th U.S. Civil Service Region, Denver, Colorado, and an Officer from the Project met with the local Union officials in Santa Fe. The officer representing the Corps of Engineers informed all concerned that the Project was not a "closed shop" and that the Corps of Engineers would not discriminate between union and non-union employees and would hire any qualified personnel certified by the U.S. Civil Service Commission. The labor situation has since been satisfactory.

(7) The turn-over of labor on the Project has been exceedingly high because of the isolation of the Project and the lack of adequate housing facilities. The absenteeism among the employees was also high because of the long distance they had to commute and because of the customary attendance of the Spanish and Indian people at religious ceremonies.

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d. Safety Record.

(1) A Safety Committee handled all problems of safety until January 1945, when it was decided by the Administrative Board to secure a full-time Safety Engineer. Mr. Stanley Kershaw of the National Safety Council was hired in February 1945. On 1 March 1945, a Safety Division was organized and a safety program was formulated dealing with both Post and Operating Contractor's safety problems. Then in May of the same year, a distinct division was made between these two (See Appendix VIII, Vol. 2, pp. III-38 and IX-19).

(2) Inasmuch as Safety Records were not maintained until after January 1945, it is impossible to give statistics before. The Accident Experience Rate for Project "Y" including satellite sites is as follows:

<u>Year</u>	<u>Frequency</u>	<u>Severity</u>
1945	13.02	1.30
1946	7.89	2.45

(3) From the beginning of the Project until the end of 1946, there had been 26 fatalities from the following causes, (Appendix P-9):

- 7 from construction accidents
- 6 from traffic accidents
- 2 from falls
- 1 from drowning
- 2 from radiation exposure
- 2 from accidental shooting
- 1 from smudge pot explosion

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2 from self-administered poison

3 from accidentally drinking ethylene glycol

(4) The Award of Honor was presented to the Manhattan Engineer District by the National Safety Council, for "Distinguished Service to Safety". The accident experience of Project "Y" was part of the Manhattan Engineer District.

e. OPA Prices and Regulations. - The question of retail price was checked with the Office of Price Administration, Albuquerque, New Mexico, and that office submitted a letter, dated 9 February 1945 which expressly states that War Department stores and commissaries are exempt from retail regulations of the OPA. (Appendix D-35.) Because of this ruling, the commissary, mess-halls and Post Exchange operations have not enforced OPA ceiling prices effective in this area. However with few exceptions, retail prices have been considerably lower than those existing in the city of Santa Fe.

One apparent exception occurred in the case of milk. However, facts indicate that the Contractor chosen to supply milk to the Project was the only one who was able to meet the purity standards and bacillus specifications set by the Los Alamos Project Veterinarian, charged with all food inspection. Investigation by those in charge, showed that no other supplier was in a position to deliver the quantity of milk necessary, of the quality which would conform to the rigid standards set up. Thus, while the price of bottled milk on the reservation was from six to ten percent higher than the price in Santa Fe, the difference could readily be attributed to the difference in butter fat content and the adherence to purity standards.

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f. Schools.

(1) During the summer of 1943, it became apparent that school facilities would have to be provided for the children of resident families. There had been a small elementary school at the Alamos Ranch School, but the building was inadequate in size for the Project. Dr. Walter W. Cook, Professor of Education, University of Minnesota, was called into consultation with the Director and Division Leaders of the Project. These men mapped out the structures needed and the policies to be adopted for a school system which proved to be adequate and satisfactory from an educational standpoint.

(2) The original building, designed by Cook and Brazier (App. E-13, E-62, 63), was built to include facilities found in most modern schools. The equipment was scaled in size to the children's age level. Emphasis was placed upon simplicity and efficiency of classroom surroundings, proper lighting and up-to-date apparatus for use in various courses. The first building had four elementary school rooms and four high school rooms, which were ample for the enrollment of 140 children. However, each year additions have been constructed to take care of the increase of school population. At the end of the 1946 school year, there were over 350 students enrolled in the Los Alamos grade and high school. And, at the beginning of the fourth school year in the fall of 1946, another wing of five rooms was completed, housing the new library, home economics class and general science classes. This new addition raises the number of work rooms to 25.

(3) An adequate salary schedule has attracted a high type of teacher to this school. The average weekly salary is \$72.57.

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of the teachers were wives of employees at the Project. There were 11 instructors on the original faculty for both elementary and high school. At the end of 1946 there were 18 grade school teachers and 13 high school instructors, and one superintendent for the somewhat more than 350 students. This favorable ratio of children to teacher makes possible individual assistance and instruction not normally encountered and gives a wider choice of subjects to the student.

(4) In addition to the teaching faculty, a trained nurse and a physician are assigned to the school, who give physical examinations to new entrants, make arrangements for immunization shots on tetanus, typhoid and other contagious diseases, and aid in maintaining a high health level.

(5) The first School Board was composed of six men appointed by the Director of the Project. These were to represent the Technical and Post Areas and were to confer with the School Superintendent as a liaison group to help formulate school policies. The board later increased to eight members. The only major change in this school board set-up occurred in August 1946. At that time, nominations were proposed from the Technical Area, Zia Company, and the Post (Government) Group. Three separate elections were held, with voters electing three members from the nominees of the Technical Area, two members from the Zia Company group, and one member from the Post group. All civilian residents of Los Alamos over 18 years of age, and all eligible military personnel, in each respective group, could vote for the desired candidate or candidates of that group.

(6) The school operated as a free, public institution.

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The Government paid expenses, with the University of California originally acting as the Government paymaster, paying all school salaries, and handling all requisitions for textbooks and school equipment. (Appendix C-2.) This policy was changed in June 1946, when Zia Company took over the function.

(7) Nursery School. - The regular school system was supplemented by a nursery school for children from two to five years of age (Appendix E-58). Its primary purpose was to provide supervisory care for the younger children of mothers employed on the Project, and was operated on a partially self-supporting basis. A director, four teachers, cook, maid and janitor composed the staff of this unit. Careful regulations govern the amount of rest and proper diet, as well as the inculcation of good basic school habits.

g. Disposition of Funds. - Originally all monies received from commissary sales, furnishing of subsistence and quarters, utilities and all other income accruing to the Government, were forwarded to the Finance Officer, U.S. Army, for deposit to the credit of the Treasury of the United States. (This did not include the collections of the Community Association; see par. 6-5.) In February 1944, the contract with the operating Contractor was modified, directing that all monies collected be forwarded to Lt. Col. S. L. Stewart, Contracting Officer, to be credited against the contract cost. (For authority in the change of procedure see Appendix F-36.) In the Fall of 1946 this procedure was again altered and transmittal was made to the Zia Company.

Figures furnished by the Fiscal Office show the following transmittal:

Funds Transmitted to University of California

1944	\$ 588,587.11
1945	1,277,631.84
1946	1,833,188.10

Funds Transmitted to the Zia Company

1946	\$ 11,839.85
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(These funds have been credited against costs and deducted in obtaining the cost figures shown in Section 5.)

h. Claims Against the Government. - There were no claims filed against the Government throughout the history of the Project except comparatively small ones, such as those resulting from automobile accidents and from blast effects, which were settled in a routine manner. After Frijoles Lodge had been released by the Manhattan District as extra housing, a claim for damage was entered against the Government for injury to property. This and other small claims of like nature were settled by the Contractor. (Appendix F-11.)

i. Legal and Patents. - In a community the size of Los Alamos there naturally arise a number of situations in which legal counsel is required, not only in the official project functions but also in the personal affairs of the residents and military personnel assigned to the station. Because of the isolation of the community, local attorneys were not readily available and, further, the desire for maximum security suggested the use of resident counsel which might be available. Captain Ralph Carlisle Smith was assigned to the Technical Area of the local Project on 23 June 1943, as a special representative of the Office of Scientific Research and Development. In addition to the primary duty of

Patent Advisor, Captain Smith (later promoted to Lt. Colonel) was placed in charge of the Legal Section of the Post Headquarters. Eventually other attorneys joined the Project and shared the legal duties. Among the responsibilities of this group was the contacting of the local authorities in the State organizations, to provide for integration of the community without conflict with local regulations, while maintaining security.

j. Insurance. - The various contractors all held insurance for their employees, who were also covered by Workmen's Compensation service-incurred injuries. Civil Service employees are covered only by the U. S. Compensation for injuries sustained on duty.

When the Zia Company was awarded the maintenance contract for Los Alamos they made arrangements with the operating contractor to be blanketed under their effective insurance policy with Globe Indemnity New York City. Zia Company assumed a pro rata share of the insurance rate, as based on total Zia employees. This plan was in effect from April 1946 through 4 September 1946. After that date, Zia took separate policies with the U. S. Fidelity & Guaranty Co., Baltimore Md., covering Workmen's Compensation and Contractors General Liability Insurance.

An unofficial agreement was set up with the Business Men's Association for a hospitalization plan for all employees after hospitalization was no longer furnished free by the Project. It is a plan whereby specified sums are taken from monthly salaries at the request of the employees. These payments provide certain hospital benefits for individuals and their families.

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SECTION 7 - ORGANIZATION AND PERSONNEL

7-1. Administration (Gov't). - Lt. Colonel J. M. Harman was originally assigned as Commanding Officer at this station and was set out to set up his organization primarily in a service capacity, to take care of the feeding, housing, general comfort and welfare of the Operating Contractor's personnel. His duties were set forth specifically in a letter dated 25 February 1943 from General L. R. Groves and ^{Dr.} James B. Conant to Dr. Oppenheimer. (Appendix 1, Volume 2, Book VIII.) Lt. Colonel Harman arrived in Santa Fe, New Mexico, 16 January 1943, and set up the original office in Room Number 8, Bishop Building, where it remained until 19 April 1943 when it was moved to Los Alamos. Three letters from General Groves dated respectively 22 February 1943, 27 February 1943 and 27 February 1943 to the Commanding General, Service of Supply, (Appendices D-37, D-38 and D-39) outlined the requirements for personnel and supply for this Project, and gave the Commanding Officer of the new military post adequate power to perform his assignment.

Among the first officers to serve at the station in the various main divisions of the Post Headquarters were Major W. A. Stevens, Operations Officer; Captain M. E. Davis, Administrative Officer and Adjutant; 2nd Lieut. Curtis L. Clark, Intelligence Officer; 1st Lieut. V. F. Dean, Post Exchange and Civilian Mess Officer; 1st Lieut. James Nolan and 1st Lieut. J. J. Horowitz, Medical Officers, Captain E. A. White, Supply Officer and Captain Ralph Carlisle Smith, Legal and Patent Officer and OSRD representative. In addition there were officers assigned to the various detachments operating under the 8th Service

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Command.

Major S. L. Stewart was assigned to work with the local Project about 1 March 1943 and established his headquarters in the Los Angeles Procurement Office on 1 April 1943, serving as the contracting officer for the University of California contract and related contracts, and Area Engineer.

The original plan was to have approximately six officers and a minimum number of civilians in key positions, with a group of WACs and enlisted men to serve in clerical capacities. This arrangement was made obsolete in a short time by the development of the Project and the immediate need for a larger administrative staff. Each period of growth resulted in organizational changes. (Appendices B-2, B-3, B-4, B-5, and B-6.)

Colonel Harman, who was promoted on 15 February 1943, remained Commanding Officer until May 1943, when he was succeeded by Lt. Colonel Whitney Ashbridge. Lt. Colonel Ashbridge commanded the Post until October 1944, at which time Colonel G. R. Tyler became Commanding Officer. He in turn was succeeded by Colonel L. E. Seeman in November 1945. Colonel Seeman was in Command until September 1946, when Colonel Herb C. Gee was assigned that duty.

a. Headquarters Personnel. - In addition to the Army staff, key civilians were appointed to act as supervisors in various sections. Civilian Personnel Section was organized under J. P. Adams; P. A. Curran assisted Captain E. A. White in operation of the Procurement Section; Town Management was the responsibility of F. W. Grefe as

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R. B. Osborne; the Commissary was managed by M. H. Gurley and the Warehouse and Property Manager was V. R. Lefler.

From the small group of 32 Civil Service employees on the Post in February 1943, the strength grew to a peak of 2600 in March 1946. There was a sharp drop in this number in April 1946 when approximately 1800 employees were transferred to the newly organized Zia Company. (Appendix B-7.)

b. Military Personnel. - In addition to the Headquarters staff, three troop units were originally assigned to the Post, and a fourth was initiated in October 1943. They were the Military Police Detachment, the Provisional Engineer Detachment, the Provisional WAC Detachment, and the Special Engineer Detachment.

(1) The MP Detachment, 4817 Service Unit, started April 1943 with seven officers and 196 enlisted men, plus a veterinarian and a medical officer attached. The MP officers were Captain A. L. Cernaghan, 1st Lieut. C. E. Day, 1st Lieut. E. V. Hughie, 1st Lieut. M. Wroe, 2nd Lieut. R. M. Cassidy, 2nd Lieut. H. C. Bush and 2nd Lieut. J. F. Vollmer; 1st Lieut. J. J. Horowitz was the Medical Officer and 1st Lieut. R. E. Thompsett was the Veterinarian. The principal function of this detachment was to serve as security guard for the Project. This has been discussed at length in paragraph 6-10. As the Project increased in size many additional guard posts were necessarily established, and the unit was authorized a new strength of nine officers and 48 enlisted men, and as of 31 December 1946 there were approximately 500 assigned to this Detachment.

(2) The Provisional Engineer Detachment was formed

Camp Claiborne, Louisiana, by Letter Order dated 10 April 1943, authorizing one officer, 1st Lieut. Clinton A. Nash, and 42 enlisted men in the T/O. (Appendix F-12.) This group reported to Colonel Harman 18 April 1943. It was purely a service organization with all personnel picked to fill specified jobs. They operated the power plant, steam plant, Motor pool and garage, mess halls, as well as repaired and maintained buildings and roads. As the Post grew this unit was increased to 256 men and two officers, 1st Lieut. C. A. Nash and 2nd Lieut. Huene, to fill the needs of the growing community by taking over posts in the Commissary, Post Exchange and Post Engineer Office which could not be filled by qualified civilians. Later still the Provisional Engineer Detachment was increased to 465 men because of additional mess halls, enlargement of power and steam plants and a larger number of motor vehicles, requiring more personnel for their operation. A small sawmill also was set up and operated by this unit. Both the MP and Provisional Engineer Detachments were subsistent on garrison rations, which were secured from the Quartermaster at Bruno General Hospital, Santa Fe. The MP Detachment operated the Mess Hall and supply room for both organizations. The Provisional Engineer Detachment had 302 EM assigned to it June 1946 and was inactivated 1 July 1946.

(3) The WAAC Detachment was activated by Letter Order dated 17 April 1943, and formed in Ft. Sill, Oklahoma, as the First Provisional WAAC Detachment. Its strength was the Commanding Officer (3rd Officer Helen E. Malvihill) and six auxiliaries. These seven reported to Los Alamos on 21 April 1943. In June, four more auxiliaries joined the unit, which slowly but steadily grew.

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(4) The entire organization of two officers, 2nd Lieutenants Mulvihill and Creighton, and 43 enlisted women, was sworn into the Army of the United States by Lt. Colonel Ashbridge, 24 August 1943.

(5) The working program for WACs was not well defined at the beginning and all were put on basic jobs, although many of them had technical qualifications. But as they proved their ability they were placed in practically every department on the Project. Several were engaged in scientific research and many were in positions handling highly classified material. They were also librarians, clerks, telephone operators, cooks, drivers, and approximately twenty medical WACs served as hospital technicians.

(6) The growth of the detachment resulted in an authorized strength of 150 Enlisted Women and, as this still did not meet the actual requirements, additional WACs were assigned from the Office of the District Engineer, attached to the 8th Service Command unit for duty. In August 1945, the peak month, the strength of the WAC Detachment was approximately 260, which included both assigned and attached personnel. In June 1946 it had decreased to 84 because of the demobilization program in the Army. The detachment was inactivated 19 October 1946. (Appendix F-13.)

(7) The Special Engineer Detachment was established in October 1943 as a unit of 9812 Technical Service Unit, directly under the District Engineer, and did not come under the jurisdiction of the Eighth Service Command. This unit was formed to retain employees of the Operating Contractor who were drafted and also to supply trained technicians.

personnel to the Contractor for positions it was impossible to fill with civilians. The majority of the enlisted men in this unit came directly from ASTP schools and were selected through the Office of the District Engineer on the basis of previous background and education. They consisted primarily of mechanical, electrical and chemical engineers or men of similar scientific backgrounds. Enlisted personnel of this type proved extremely valuable to the Contractor, and the unit grew rapidly. Its strength as of 1 March 1945 was approximately 800 men, requisitions in at that time for additional personnel which would increase its size to approximately 1000 men; eventually this increased to 1823 in October 1945. Demobilization of the Army cut this Unit to a low in 30 June 1946, with a total of only 403. Regular Army replacements were used to build the detachment up again to an approximate strength of 800 in December 1946. (See also, Bk. VIII, Vol. 2, p. 11)

(8) The Medical Detachment was originally a part of the MP Unit and a dispensary was operated in that Unit's area to take care of military personnel on duty at this station. This set-up proved inadequate, however, and the one officer and fourteen enlisted men who were assigned to medical work were combined with the medical personnel in the Station Hospital, where all Military personnel were then cared for.

(9) The Engineer, MP and WAC Detachments were all parts of a Service Command Unit, their specific title being 4817th Service Command Unit, 8th Service Command Detachment. At the time the Project first started, Colonel Harman made a special trip to 8th Service Command Headquarters and contacted the Chief of Staff to give him some background as to the secrecy of this Project and as to the necessity of

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many cases of not following normal Army procedures. Lt. Col. Whitne Ashbridge and Captain Davis later made follow-up contact trips to the Service Command, which was at all times most cooperative in the handling of personnel matters as well as equipment and supply. Special arrangements were made with the Service Command so that, when it became necessary to transfer enlisted personnel for security reasons, a man could be shipped immediately to a port of embarkation and the Service Command could be notified by teletype that this had been done. The Service Command was also extremely helpful in securing qualified personnel to fill vacancies in the different detachments.

(10) Special efforts were made through screening and personal interview to obtain officers who had outstanding experience, training and an unimpeachable background from a security standpoint. However, as is to be expected over a period of years, there was a substantial turnover of officers assigned to the station. The released officers fall into two general classifications: 1) those transferred to other stations and 2) those discharged from the military service. The reasons for transfer were varied. Some men were assigned for special duty and when this responsibility was completed they were released for reassignment in the Manhattan Project or elsewhere. Other officers were transferred sometimes at their own request because they were unable to adapt themselves to the unusual conditions existing at the local project or sometimes it was found that the special training of an individual was not being used to best advantage in his local assignment and the officer was released to the general Army organization for better utilization of his training. In some cases officers were transferred

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other locations, including hospitals, for medical reasons. A very few officers stayed at Los Alamos from the early stages in 1943 through May and later.

(11) It is believed worthy of mention at this point that a considerable hostility developed between the technical area civilian workers and the workers, civilian and military, in the Post Administration. The original arrangement of the camp contributed to this materially. In addition to a fence around the main Project Site there was a fence around the Technical Area. However, the fence which caused the greatest friction was one which cut across the main site at the Post Headquarters. This fence separated the Military Police and Provisional Engineer Detachments and construction camp workers from the rest of the population. During the day individuals were free to pass through the two gates in this fence. However, at about six in the evening one gate was closed and a military policeman stood guard at the other. It was permissible for members of the general civilian area to go to the Theatre #1 in the Military Area but it was not permissible for the military personnel or construction workers to enter the other general civilian area without an invitation. Furthermore, the Post Exchange in the civilian area received the more extensive equipment and supplies. Although the segregation did not last long, a natural resentment arose from which the Project never recovered.

(12) The original group of enlisted men serving at Los Alamos had volunteered for overseas duty and were resentful of the assignment, particularly when they observed many young men who were not in uniform. Most of the officers and none of the enlisted men of the

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original detachment were permitted to know specifically the nature and importance of the work. Consequently the Technical Area workers, both civilian and military, were called "phonies", "technical area jerks" "longhairs" by a substantial proportion of the Post organization. The situation was not improved by the fact that technical area civilian workers could have housing for dependents whereas military personnel could not. In some cases menial tasks for the civilian population were assigned to the enlisted personnel, which caused further dissatisfaction. Other incidental irritating items included the lodging of the detachment officers in semi-barracks and the refusal to permit the officers to form a regulation club. Actually the Army and Navy officers did form an association known as the Officers' Lounge but care was observed that civilians were not invited, to be certain that charges of discrimination were not leveled.

(13) Few of the military, naturally, were at Los Alamos by their own decision and most of them were unhappy with their lot. Furthermore, the military were bound by regulations which did not always permit them to accede to the requests of the civilians. The refusals by the military were not always gracious. As a result, a considerable portion of the business was done at arm's length.

(14) Promotions at Los Alamos for a substantial period were very slow and at times the privilege of furloughs and leaves was suspended for security reasons. Recreational facilities were inadequate. Censorship of mail existed, and contacts with the outer world were materially reduced.

(15) With the addition of the Special Engineer Detachment, the morale problem became even worse. The Table of

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Organization of that unit permitted all members to be non-commissioned officers with the consequent benefits. One-third of the men were sergeants and higher, one-third duty sergeants and one-third corporal or the equivalent in technician ratings. Many of the SSG's were completely without basic training but they received their ratings on the basis of their technical area assignments. The civilian scientists became interested in these military co-workers and entered into the matter of promotions, details and punishment extensively. This apparent infringement on the military prerogative was not accepted gracefully. Other detachments were somewhat concerned over the fact that many men were at Los Alamos for a period of years and had not yet been made non-commissioned officers.

(16) The foregoing comments are not given for the purpose of justifying the latent hostility which existed but only in partial explanation of some of its sources. It is equally interesting to note that even before the nature of the project was published, many enlisted men attempted to obtain transfers to the SSG detachment. In a few cases this was done. Even more important, however, was the effect on morale when the news was received that Los Alamos had produced the atomic bomb which was dropped on Hiroshima. The men who were most bitter about the assignment and most resentful of the civilians suddenly were an intimate and vital part of the Los Alamos laboratory which performed this exceptional job.

(17) All military personnel responsible to the local headquarters were not at Los Alamos. Various other installations, such as the Los Angeles office, Sandia Base at Albuquerque, and the like,

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considered elsewhere in the Manhattan Project history. However, mention should be made of the unit of the MP Detachment which was stationed at that portion of the Alamogordo Bombing Range, which has been identified by the code word "Trinity". This unit under the command of 1st Lieutenant Howard C. Bush was in charge of security of the atomic bomb testing installations during the preparatory stages for and the actual testing of the Atomic Bomb on 16 July 1945. The detachment has been reduced to a simple guard staff under Chief Warrant Officer R. C. Harmon. Details of the Trinity test are covered in Book VIII, Vol. 2 of the History.

7-2. Site Selection Personnel. - As was mentioned in paragraph 2-3, Lt. Col. W. H. Dudley of the Manhattan Engineer Division was appointed to supervise the preliminary site investigation early in November 1942. This operation required many trips into the various sites considered and involved a number of reports. He was assisted in this work by Col. L. Rosenberg and Col. R. E. Cole of the U.S. Engineer Office, Albuquerque, New Mexico, and by Capt. William D. Welch, Capt. Floyd Snyder and Mr. Henry K. Shadel, of the Real Estate Sub-office of the Southwestern Division of Albuquerque.

7-3. Land Acquisition Personnel. - After all the necessary authorization had been made to acquire the new site for Project "Y", (Section 3), necessary instructions were issued by the Commanding General, Manhattan Engineer District, to the Real Estate Sub-Office of the Southwestern Division at Albuquerque. Capt. Floyd Snyder and Mr. Henry K. Shadel carried through the transaction under the supervision of Lt. Col. W. H. Dudley. This arrangement was efficient, for these men were thoroughly familiar with the background and persons involved in the

matter. (Paragraph 7-1a.)

7-4. Operations Personnel. - The officer staff at Los Alamos Post Headquarters remained quite small for the first two years and the multiple functions of the headquarters of Lt. Col. Ashbridge were divided among these officers, consequently it is difficult to separate the organization into the usual categories of an Army installation without substantial redundancy. Major W. A. Stevens was the first Operations Officer so designated, but in addition he served as Executive Officer and had miscellaneous assignments in the Technical Area. The Operations Officer was the representative of the Commanding Officer in matters of design and engineering, construction and operations, including maintenance and repair. The Post Engineer was a member of his staff and followed the construction, maintenance and repair work. With the pressure of other work, Major Stevens was relieved of operations by Major J. H. McGavock, who had arrived at the station about September 1943. Major McGavock received an overseas assignment early in 1944, and was replaced by Major F. W. Salfingere. When Major Salfingere left Los Alamos in 1945, W. A. Stevens, now Lt. Col., returned to the Operations Office under Col. J. R. Tyler. Col. L. E. Seeman took command of the entire installation including Sandia base in November 1944 and also assumed the position of Associate Director of the Los Alamos Scientific Laboratory. With this new type organization, it was necessary to have a Deputy Commander in charge of the Post Headquarters. Lt. Col. Stevens was so designated. Capt. Van Reid, who till then was Post Engineer and Assistant Operations Officer, was made Operations Officer. Lt. Col. W. J. Penly relieved Capt. Reid. Under Col. H. C. Gee, as

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Commanding Officer, in September 1946, Col. A. Nauman was made Operations Officer with Lt. Col. Penly and Major B. B. Geery as assistants.

7-5. Maintenance and Repair. - The original organization established for the maintenance of the Post consisted of a Post Engineer, under Operations Division, who had, in addition to the Provisional Engineer Detachment, foremen of various trades working under him, with crews of the required crafts working under the foremen. However, the repair and maintenance work for the Technical Group facilities was done by personnel employed directly by the Operating Contractor. In January 1944, it became necessary for the Post Commander and Post Engineer to assume responsibility for all construction and maintenance on the Project, including the satellite sites, and at that time the expansion of the organization began. When the Commanding Officer of the Post assumed responsibility for this work, a new Operations Division was established. Major Holsvoek was placed in charge of this new division and two Post Engineer Organizations were activated. One Post Engineer, Captain Forrest, had charge of the Post, the housing and administrative areas, and the other, Captain Davalos, supervised the required work in the technical area and the outlying sites. This type of organization remained in effect from approximately 1 January 1944 until 1 January 1945 (App. B-3a). After the latter date, the scope of the project had increased to such an extent that it was deemed advisable to consolidate the organization and eliminate the dual Post Engineer set-up. This was accomplished by reorganization in the Operations Division, with all design, engineering, construction and maintenance directly under the supervision of the Operations Officer. This reorganization established

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a clear line of demarcation between new construction work and maintenance and operation jobs. It also gave the division head of the construction organization complete charge over all construction crews, requisitioning of materials, etc., so that the maximum efficiency was reached in supplying required labor and materials to the most urgent jobs in all areas.

7-6. Design and Engineer Personnel. - The Post Engineering Officer, with a few qualified engineers (enlisted men) was responsible for some preliminary planning, alterations and revisions, but inasmuch as most of the designing and engineering was done by Architect-Engineers W. C. Kruger (Section 4), it was not necessary to have a large engineering organization for the Post. Later this staff was enlarged to assist the force account but with the Zia contract it was again reduced. 1st Lt. Clinton A. Nash was the first Post Engineer, in addition to being Commanding Officer of the Provisional Engineer Detachment (par. 7-1, b(2)). He was succeeded by the following Post Engineer Officers:

1st Lt. Thomas E. Philbin
Capt. S. P. Davalos
Capt. C. U. Forrest
Capt. Sam Musser
Capt. Van Reid

This position became Assistant Operations Officer the latter part of 1945, and no longer functioned as a separate unit.

7-7. Construction Personnel. - As was explained in Section 5, most construction was done by contractors but it was necessary to set up a Government organization of construction workmen, to maintain facilities and often to construct additions or to revise existing structures. This was done early in the course of the Project and hired labor (Force

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Account) was under supervision of the Operations Officer until April 1946, when the Zia Company shouldered the operation and maintenance responsibility. The transfer of personnel to the Zia Company is indicated on a Graph in Appendix B-7.

7-8. Population Figures. - No official census was ever attempted at Los Alamos until April 1946, as the total population was considered highly classified information. The first large group of employees came in January 1943, approximately 1500 Sundt construction workers. By the 1st of July 1943, it was considered that the major portion of construction had been completed, and the force was reduced to an estimated 1,000. Then came another rush of development when 1800 workers were added to Sundt's payroll, which then gradually dwindled until the contract expired the end of December. J. E. Morgan and Sons employed almost 400 employees during the four months their contract was in effect. Statistics on R.E. McKee employees fluctuate constantly, reflecting periods of construction activity. The University of California and Civil Service employees show a rapid increase at first, and then a gradual climb. Reference to graph (Appendix B-7) will aid in following population trends. At the beginning of the Project, practically all dependents were working, as housing was only provided for employees. As housing became available the number of dependents increased, without a corresponding worker increase; this condition was caused mainly by the replacement of military personnel without resident dependents by civilian personnel with families. This is shown in Appendix B-2. The total population as of January 1943, was approximately 1500; by the end of the year it was estimated at 3500; in December 1944, it had reached 5675. There was a sharp increase during 1945 and the year ended with an estimated total of 8200. This growth continued throughout 1946 and as of 31 December there was an estimated total of 10,000.

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