U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment # DOI-BLM-NV-B020-2012-0214-EA
DOE/EA-1921

DATE: December 2012

Silver Peak Area
Geothermal Exploration Project
ENVIRONMENTAL ASSESSMENT

Geothermal Lease: N-87008

Tonopah Field Office
P.O. Box 911
1553 S. Main Street
Tonopah, NV 89049
Phone: 775-482-7800
Fax: 775-482-7810

BLM

Tonopah Field Office

BLM Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 LOCATION AND SUMMARY OF PROPOSED ACTION

Rockwood Lithium Inc (Rockwood), formerly doing business as Chemetall Foote Corporation, is proposing to construct, operate, and maintain the Silver Peak Area Geothermal Exploration Project (Project) within Esmeralda County, Nevada (see Figure 1) to determine subsurface temperatures, confirm the existence of geothermal resources, and confirm the existence of a commercial geothermal reservoir at the proposed well sites within federal geothermal lease N-87008. The area to be explored (project area) consists of federal geothermal lease N-87008 and is within portions of Sections 23-24, Township 2 South (T.2S.), Range 39 East (R.39E.), Mount Diablo Baseline and Meridian (MDB&M) (see Figure 2). Appendix B contains the lease referenced in this document and the respective approval, effective date, terms, conditions, and stipulations.

An Operations Plan for the construction, operation, and maintenance of these exploration wells was submitted to the Bureau of Land Management (BLM) Tonopah Field Office (TFO) in July 2011 and finalized in November 2011. Geothermal drilling permits would be submitted for the drilling of the exploration wells. Should this exploration project encounter and prove that a suitable geothermal resource is present, Rockwood would pursue development of the resource with the intent of providing electrical power for their adjacent lithium processing facilities. Given the uncertainties associated with geothermal exploration and the fact that most geothermal exploration on BLM land does not lead to the identification of geothermal resources that prove viable at a commercial scale, future development of the resource is not considered reasonably foreseeable for the purposes of compliance with the NEPA.

Rockwood has requested to obtain aggregate from Tonopah Sand and Gravel's Tonopah Airport Pit (N-80954) for well pad construction. The total aggregate required for the project is approximately 7,000 cubic yards.

The source of water needed for well drilling is from the freshwater supply system associated with the nearby Rockwood lithium processing facility, which acquires water from wells located at SW1/4, NE1/4, Section 28, T.2S., R.39E.

1.2 PURPOSE AND NEED

1.2.1 BLM PURPOSE AND NEED

Under the terms of the Geothermal Steam Act, its revisions of 2007, and its implementing regulations and the Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States and its Record of Decision of December 2008, BLM must respond to the proposed plans, applications and programs submitted by a geothermal lessee. BLM's need is to comply with its Statutory and regulatory obligations to respond to the Operations Plan submitted by Rockwood to conduct geothermal exploration and either approve the plan as submitted, approve the plan with required modification, or deny the plan. The BLM's project purpose is to provide Rockwood with an approved Operations Plan for geothermal exploration on their federal geothermal lease in the Silver Peak Area of Nevada. This approved Operations Plan would meet BLM's responsibility to ensure that provisions of geothermal regulations in 43 Code of Federal Regulations (CFR) 3200 (et seq.) are fulfilled. The plan would also ensure that development of the geothermal resource would be conducted without significant impact to the environment. This project would also further the purpose of Secretarial Order 3285A1 (March

11, 2009) that establishes the development of environmentally responsible renewable energy as a priority for the Department of the Interior.

1.2.2 DOE PURPOSE AND NEED

As part of the *American Recovery and Reinvestment Act of 2009* (Recovery Act) (Public Law 111-5, 123 Stat. 115), DOE's National Energy Technology Laboratory (NETL), on behalf of the Office of Energy Efficiency and Renewable Energy's Vehicle Technologies Program, is providing up to $2 billion in federal funding nationwide under competitively awarded agreements to facilitate the construction of U.S. manufacturing plants (including increases in production capacity at existing plants) that produce advanced batteries and electric drive components.

The federal action of providing funding for these projects, known as the Electric Drive Vehicle Battery and Component Manufacturing Initiative, requires compliance with the *National Environmental Policy Act of 1969* (NEPA) (42 U.S.C. §§ 4321 et seq.), the Council on Environmental Quality regulations (40 CFR Parts 1500 to 1508) and DOE's NEPA implementing procedures (10 CFR Part 1021). Accordingly, DOE is participating with BLM in the preparation of this EA to evaluate the potential environmental consequences of providing a grant under this initiative. Pursuant to a cost-sharing agreement with the project proponent, approximately $4.47 million in DOE financial assistance would be provided under the Proposed Action.

The overall purpose and need for DOE action, pursuant to the Vehicle Technologies Program and the funding opportunity under the Recovery Act, is to accelerate the development and production of various electric drive vehicle systems, through building or increasing domestic manufacturing capacity for advanced automotive batteries, battery components, recycling facilities, and electric drive vehicle components, in addition to stimulating the U.S. economy. The selected projects are needed to reduce the U.S. petroleum consumption through investment in and deployment of alternative vehicle technologies. Rockwood's proposed project will also assist with the nation's economic recovery by creating jobs in the United States in accordance with the objectives of the Recovery Act.

For a more complete explanation of the DOE's program, purposes and needs, please see the Final Environmental Assessment (EA) for *Chemetall Foote Corporation, Electric Drive Vehicle Battery and Component Manufacturing Initiative, Kings Mountain, NC and Silver Peak, NV* (DOE/EA-1715). This previous EA covered (1) the establishment and operation of a new 5,000 metric tons per year lithium hydroxide plant at an existing Rockwood facility in Kings Mountain, North Carolina; and (2) an upgrade to an existing lithium brine field production system, brine evaporation pond system, and a lithium carbonate plant in Silver Peak, Nevada. One part of the planned upgrades at the Silver Peak site is to explore and, if feasible, develop a geothermal resource for the production of electricity that would serve the lithium processing plant. Lithium is a critical element used in lithium-ion batteries, which are expected to play a major role in future electric-drive and hybrid-electric drive vehicles, as well as many applications for electronic devices.

1.3 PLAN CONFORMANCE

The public land within the project area is administered by the BLM, Tonopah Field Office. The Proposed Action is in conformance with the Tonopah Resource Management Plan (RMP) and Record of Decision approved on October 2, 1997.

- The Fluid Minerals Objective in the Tonopah RMP is "to provide opportunity for exploration and development of fluid minerals such as oil, gas, and geothermal resources, using appropriate stipulations to allow for the preservation and enhancement of fragile and unique resources". The proposed Project is within an area that is designated as "open to fluid minerals leasing subject to standard lease terms and conditions" (BLM 1997, page 22).

- The Mineral Materials Objective in the Tonopah RMP is "to provide for the extraction of mineral materials such as sand, gravel, building stone, cinders, etc., to meet public demand." The proposed Project is within an area that is designated as "open to mineral material disposal under standard terms and conditions" (BLM 1997, page 23). All mineral material disposals are discretionary. Appropriate terms and conditions are applied to ensure that the permittee would comply with all applicable laws and environmental safeguards.

The Proposed Action conforms to the land use plan terms and conditions as required by 43 CFR 1610.5.

1.4 RELATIONSHIP TO LAWS, REGULATIONS, POLICIES OR PLANS

This EA has been prepared in accordance with the following statutes, implementing regulations, and guidance:

- The National Environmental Policy Act (NEPA) of 1969, as amended (Public Law [PL] 91 190, 42 USC (United States Code) 4321, et seq.)
  - 40 CFR 1500, et seq. Council of Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA.
- U.S. Department of the Interior requirements (Departmental Manual 516, Environmental Quality)
- BLM NEPA Handbook (H-1790), as updated in 2008
- Considering Cumulative Effects under the NEPA
- Geothermal Steam Act of 1970 (30 USC 1001-1025), its revisions of 2007
  - 43 CFR 3200, Geothermal Resources Leasing and Operations; Final Rule, May 2, 2007
- The 2005 Energy Policy Act
- The National Energy Policy, Executive Order 13212
- Best Management Practices as defined in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, the Gold Book, Fourth Edition – Revised 2007 (USDI and USDA 2007)
- The Materials Act of July 31, 1947, as amended (61 Stat 681, 30 USC 601, et. seq.)
- The Multiple Use Mining Act of July 23, 1955, Public Law 167 (69 Stat 367, 30 USC 601, et seq)
- Programmatic Environmental Impact Statement for Geothermal Leasing in the Western United States (BLM 2008)
- The National Energy Policy, Executive Order 13212, and
- The Geothermal Energy Research, Development, Demonstration Act of 1974 (PL 93-140, 30 USC 1101, et seq.)

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone11N) Coordinate system and uses the NAD83 projection.

Map Date: 02/15/2012

United States Department of the Interior
Bureau of Land Management
Tonopah Field Office
P.O. Box 911
Tonopah, NV 89049

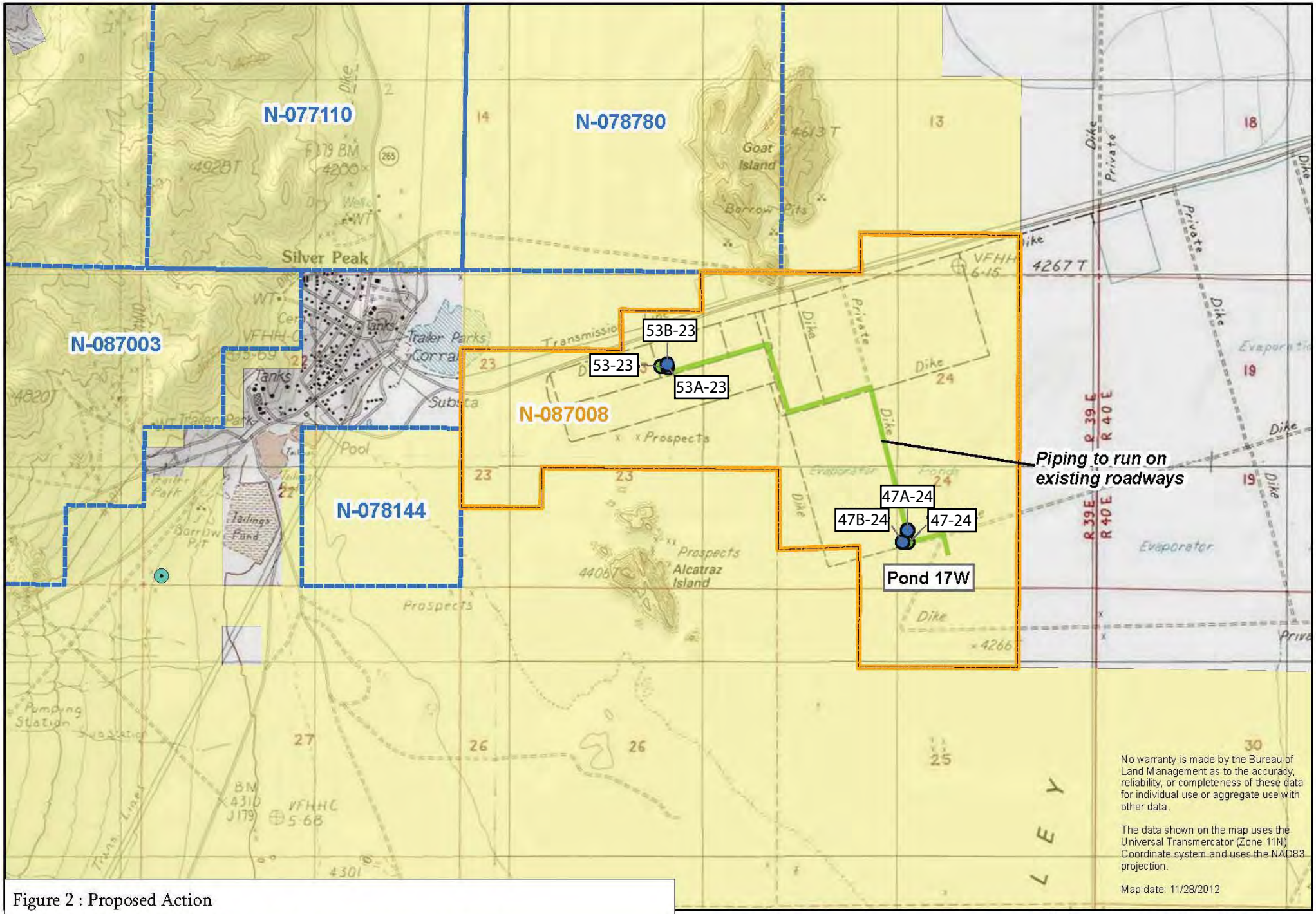


Figure 2 : Proposed Action

- Full-Size Well
- Observation Well
- Fresh Water Well
- Rockwood Lease
- Geothermal Leases

Land Status

- Bureau of Land Management
- Private

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map date: 11/28/2012

United States Department of the Interior
Bureau of Land Management
Tonopah Field Office
P.O. Box 911
Tonopah, NV 89049

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

Rockwood is proposing to construct, operate, and maintain the Silver Peak Area Geothermal Exploration Project (Project) to determine subsurface temperatures, confirm the existence of geothermal resources, and confirm the existence of a commercial geothermal reservoir at the proposed well sites within federal geothermal lease N-87008. DOE's Proposed Action is to provide a grant to partially fund Rockwood's proposed Project to explore for, and if feasible, develop a geothermal resource for the production of electricity that would serve the lithium processing plant. This EA reviews the potential impacts associated with the drilling and testing of two observation wells and four full-sized wells. If the geothermal resource and wells indicate that an economical power plant could be developed, another EA would be prepared to address the potential impacts and possible mitigation measures associated with the power plant construction and operations.

2.1.1 Overview and Location of Proposed Project

The Project is within Esmeralda County, Nevada and includes well and drill pad site preparation, geothermal well drilling and testing, and other necessary actions to support these activities. The proposed wells would be located within federal geothermal lease N-87008 on public lands managed by the BLM (see Figure 2 and Table 1).The lease area is within an evaporation pond that is part of the brine evaporation system associated with Rockwood's ongoing lithium operations. The evaporation pond is currently not in use (i.e. dry) and would not be used throughout the life of this geothermal exploration Project.

The Project would include:

- Construction activities and surface disturbance (see Section 2.1.2)
  - Constructing two drill pads and drilling an observation well and 2 full size geothermal exploration wells from each pad. Approximately 2.8 acres are required for each well pad. The surface disturbance associated with new well pad construction would be approximately 5.6 acres total.
  - Drill pad preparation activities including clearing, earthwork, drainage, containment basins (reserve pits), fencing reserve pits, and other site improvements;
- Well drilling and testing (see Section 2.1.3)
  - Short-term well testing;
  - Long-term well testing;
- Water requirements and source (see Section 2.1.5)
  - As much as 10,000 – 25,000 gallons of water per day would be required for drilling;
  - As much as 10,000 gallons of water per day would be required for grading, construction, and dust control;
  - Each well site would have a portable water tank(s) with at least 10,000 gallons;
  - Water would be obtained from the freshwater supply system associated with the nearby Rockwood lithium processing facility;
  - The total estimated water usage for project construction and implementation is 21.03 – 41.89 acre-feet;
- Aggregate requirements and source (see Section 2.1.6)

  - The total aggregate required for well pad construction would be 7,000 cubic yards;
- Surface reclamation (see Section 2.1.7 and Appendix A)

Rockwood expects that up to 1 observation well and 2 full size geothermal exploration wells would be drilled and tested from each pad within the federal geothermal lease (see Figure 2 and Table 1).

Table 1: Geothermal Exploration Wells

Kettleman Number	Section Number (and Aliquot part)	Well Type	Approximate UTM Coordinates (NAD83)	
			Easting (m)	Northing (m)
From Pad 1				
47-24	SESW Section 24	Observation Well	446969	4177817
47A-24	SESW Section 24	Full-Sized Well	446944	4177817
47B-24	SESW Section 24	Full-Sized Well	446969	4177878
From Pad 2				
53-23	SWNE Section 23	Observation Well	445702	4178719
53A-23	SWNE Section 23	Full-Sized Well	445735	4178716
53B-23	SWNE Section 23	Full-Sized Well	445732	4178731

2.1.2 Construction Procedures and Surface Disturbance

Each well pad would be approximately 400 feet by 300 feet (approximately 2.8 acres per pad). A diagram of a typical well pad layout is provided as Figure 3. Total surface disturbance associated with new well pad construction would be approximately 5.6 acres (2 pads at approximately 2.8 acres per pad).

The selected drill sites are located within an existing evaporation pond that contains unconsolidated sediments and evaporite deposits, on land that is already heavily disturbed. In order to provide stable support for the drill rigs, if any evaporates/precipitates are present on the surface, they would be scraped away and deposited adjacent to the pads (but would remain within the evaporation pond). Though it is unlikely, should any surface material be salvageable, it would be stockpiled adjacent to the pads for use during subsequent reclamation to fill the reserve pit (see Section 2.1.7 and Appendix A). Additional drill pad preparation activities could include earthwork using materials within the pond to raise the level of the well pad above the floor of the pond, topping the well pad with aggregate, drainage, and other improvements necessary for efficient and safe operation and fire prevention.

Each drill pad would be prepared to create a level pad for the drill rig and a graded surface for the support equipment. Storm water runoff from areas around the constructed drill pads would be directed into ditches and away from the drill pad. The well pad would be graded to prevent the movement of storm water from the pad off the constructed site and would be designed for a 100-year storm event.

A reserve pit would be constructed within each pad in accordance with best management practices identified in the Gold Book (USDI and USDA 2007) for the containment and temporary storage of water, drill cuttings and waste drilling mud during drilling operations. (See Section 2.1.3 for a description of well testing procedures.)

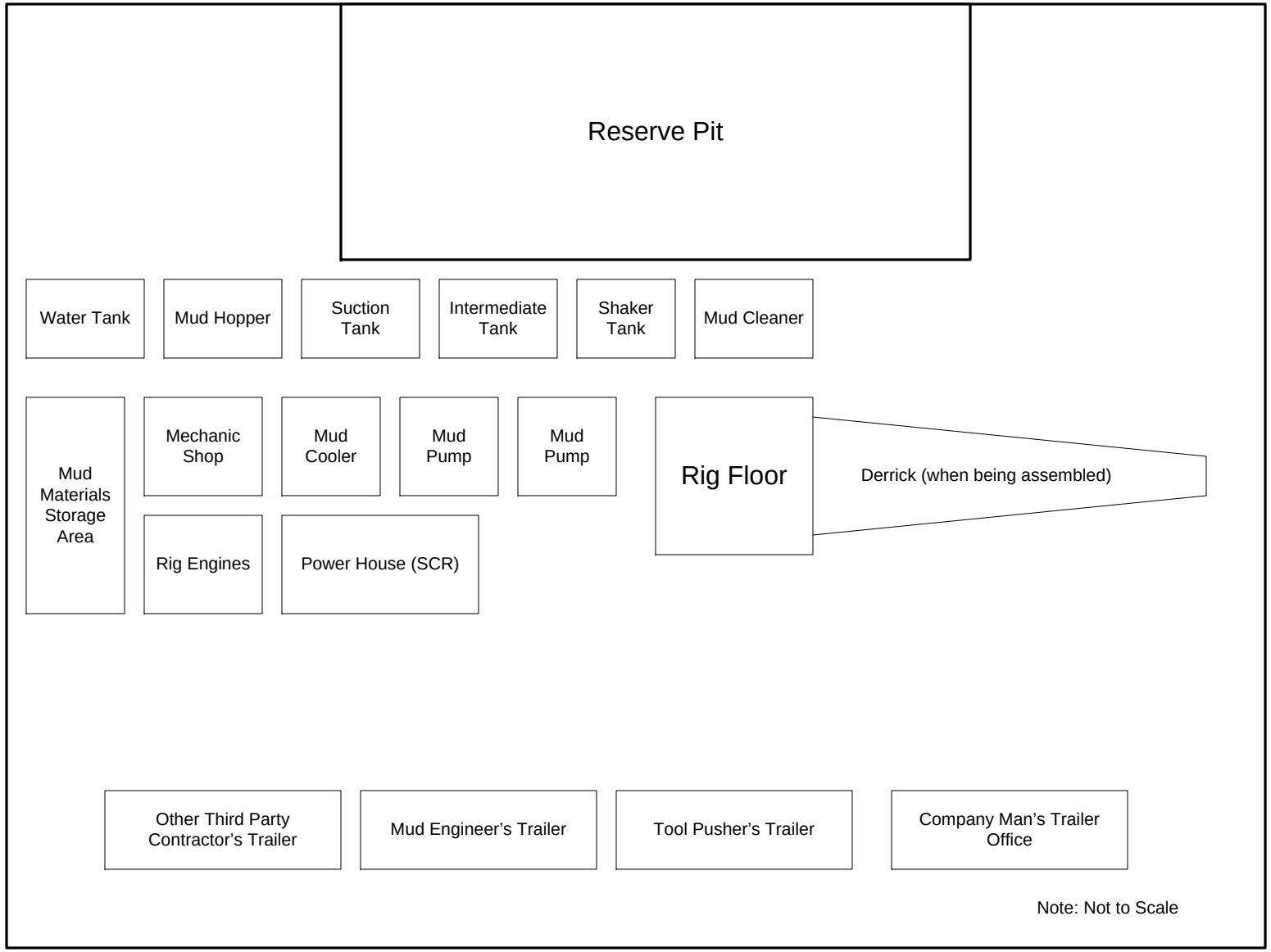


Figure 3: Typical Well Pad Layout

The reserve pits would be fenced with an exclosure fence on three sides and then fenced on the fourth side once drilling has been completed to further prevent access by persons, wildlife or livestock. The fence would remain in place until pit reclamation begins. Each reserve pit would measure approximately 200 feet by 80 feet by 10 feet deep. A 2 foot freeboard would be maintained at all times. The volume of each reserve pit is 957,500 gallons, with a 2 foot freeboard (200 ft x 80 ft x 8 ft x 7.4805 gallons/cu. ft. = 957,504 gallons). At least 50 percent of the reserve pit would be constructed below ground level to help prevent failure of the pit dike.

See Section 2.1.7 and Appendix A for a description of reclamation procedures.

2.1.3 Well Drilling and Testing

Prior to the drilling of a geothermal well on federally managed land, a Geothermal Drilling Permit (GDP) application (form 3260-2) will be submitted and approved by the BLM Nevada State Office's Petroleum Engineer and the Nevada Division of Minerals Geothermal Program lead. The final authority to approve or reject the application will rest with the BLM Authorized Officer in the Tonopah Field Office, Battle Mount District, Nevada. Provided with each GDP application are the specific drilling programs, identification of measures to protect the environment and a set of "contingency" plans. These contingency plans include an Emergency Escape/Evacuation and Sheltering in Place Plan; Rescue and Medical Response Plan; Fire Prevention and Control Plan; Hydrogen Sulfide Contingency Plan; a Spill Containment and Notification Plan; and, a Blowout Action Plan. These contingency plans are also provided as an Appendix to the submitted Operations Plan.

Specific drilling information is provided in Table 2.

Table 2: Well Drilling Specifics, Per Well

Rig Type	Rig Height (ft.)	Trucks Needed Daily (on average)	Drilling Time (days) [1,2]	Workers Onsite Daily (on average)	Depth Drilled (ft.)
Observation Well Drilling					
Small water well rig	60 ft.	3 big trucks/trailers 8 cars/service pickups	40 days	12	5,000 ft.
Full-Sized Well Drilling					
1500 hp rig	180 ft.	3 big trucks/trailers 8 cars/service pickups	60 – 80 days	25	6,000 ft. to 10,000 ft.

[1] Difficulties encountered during the drilling process, including the need to re-drill the well, could as much as double the time required to successfully complete each well.
[2] Drilling would be conducted 24 hours a day, 7 days a week.

Any staging or laydown areas would occur on constructed well pads. The drilling supervisor and mud logger would typically stay in a trailer on the active well site while the well is being drilled.

Each well would be equipped with appropriately designed and installed "blow out" prevention equipment, as required by the BLM (43 CFR 3261.13 and 3262.10). Specifications of blow out prevention equipment and action plans are required as a condition of approval for the BLM GDP for each well.

During drilling operations for the observation wells, water would be delivered by one of the site's 2,000 – 3,000 gallon water trucks as needed. During drilling operations for the full-size wells, a minimum of 10,000 gallons of fresh water and 12,000 pounds of inert, non-toxic, non-hazardous

barite (barium sulfate) would be stored at each well site for use in preventing uncontrolled well flow ("killing the well"), as necessary.

The well bore would be drilled using non-toxic, temperature-stable drilling mud composed of a bentonite clay-water or polymer-water mix for all wells. Materials and chemicals commonly used during well drilling and stored on site are described below in Table 3. Specific materials and quantities to be used would be determined based on conditions encountered during drilling. Variable concentrations of additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. Additional drilling mud would be mixed and added to the mud system as needed to maintain the required quantities.

Table 3: Materials and Chemicals Commonly Used During Well Drilling (Quantities Per Well)

Product	Quantity Used (Avg. Daily)	Quantity Stored	Hazardous Material [1]
Drilling Mud Gel (Bentonite Clay)	50,000 lbs	100-lb sacks on pallets	No
Sodium Bicarbonate	1,250 lbs	50-lb sacks on pallets	No
Sodium Carbonate	1,500 lbs	50-lb sacks on pallets	No
Aluminum Distearate	200 lbs	50-lb sacks on pallets	No
Barite ($BaSO_4$)	4,000 lbs	100-lb sacks on pallets	No
Lime (Calcium Hydroxide)	1,500 lbs	50-lb sacks on pallets	Yes[2]
Caustic Soda (Sodium Hydroxide)	1,000 lbs	50-lb sacks on pallets	Yes[2]
Diesel Fuel	6,000 gals	12,000-gal tank	Yes[3]
Lubricants (Motor Oil, Chain Oil, Gear Oil, Hydraulic Oil)	475 gals	55-gal drums and 5-gal buckets	Yes[3]
Anti-Freeze (Ethylene Glycol)	110 gals	55-gal drums	No[4]
Liquid Polymer Emulsion (partially hydrolyzed polyacrylamide/polyacrylate (PHPA) copolymer)	125 gals	5-gal buckets	No
Sodium Polyacrylate	200 gals	5-gal buckets	No

[1] Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the EPA, the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its own definition of hazardous material
[2] The material is characteristically hazardous due to its corrosivity
[3] The material is characteristically hazardous due to its flammability
[4] This material is considered orally toxic following ingestion

In the unlikely event a well bore requires re-drilling, efforts may consist of the following:

(1) re-entering and re-drilling the existing well bore; (2) re-entering the existing well bore and drilling and casing a new well bore; or (3) sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing. While the drill rig is still over the well, the residual drilling mud and cuttings would be flowed from the well bore and discharged to the reserve pit.

Once the well is drilled and well head completed, an industrial grate would be placed over the hole to prevent humans and wildlife from falling into the cellar.

2.1.3.1 Short-term Well Testing

Full size wells would undergo short-term well testing. Each test, lasting approximately four days, would consist of flowing the well while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters.

Geothermal steam and noncondensable gases would be separated from produced geothermal fluid and discharged to the atmosphere through a rock muffler (if used) or steam separator. A surface booster pump would pump the residual produced geothermal fluid through a temporary 8" to 10" diameter pipeline to route the produced fluid:

1) to the constructed reserve pit(s); and/or

2) into one or more 500 bbl Baker Tanks contained on the well pad; and/or

3) into one of the other geothermal wells drilled within the project area; and/or

4) into Rockwood's existing Pond 17W, as the primary destination for the produced fluids for well testing. Pond 17W is an existing evaporation pond associated with the existing Rockwood brine evaporation system, and is located southeast of the 53-series wells (see Figure 2). This pond is 314 acres, has a 59-million gallon capacity, and is clay lined which serves to prevent infiltration. Well testing fluids would be allowed to evaporate. Pond 17W is currently almost empty, though during normal use, would be filled to about 2 foot deep. Fluid would be piped via a temporary pipeline. This pipeline would be laid on the surface of the disturbed shoulders of the access roads (see Figure 2).

An "injectivity" test may also be conducted by injecting the produced geothermal fluid from the reserve pit back into the well and the geothermal reservoir. The drill rig would not be moved from the well site following completion of these short-term test(s).

Each short-term well test is expected to flow approximately 7,000 barrels (bbl) of fluid per day (1 barrel = 42 gallons @ 7,000 bbl/day for 4 days = 1,176,000 gallons). Fluid produced during short-term testing would be piped (via the temporary pipeline) primarily to Pond 17W for evaporation and/or stored in a 500 bbl Baker Tank and/or piped to the reserve pit.

2.1.3.2 Long-term Well Testing

One or more long-term flow test of each full size well drilled would likely be conducted following the short-term flow tests to more accurately determine long-term well and geothermal reservoir productivity. Each long-term flow test could last as long as 10 days.

Geothermal steam and noncondensable gases would be separated from produced geothermal fluid and discharged to the atmosphere through a rock muffler (if used) or steam separator. A surface booster pump would pump the residual produced geothermal fluid through a temporary 8" to 10" diameter pipeline to route the produced fluid into one of the other geothermal wells drilled within the project area. Each long-term well flow test is expected to flow approximately 34,000 to 70,000 barrels of fluid (1 barrel = 42 gallons @ 34,000 to 70,000 barrels = 1,428,000 to 2,940,000 gallons).

2.1.3.3 Drilling Schedule

The Drilling Program would commence immediately following construction of the drilling pads. The duration estimates listed below may be shorter or longer than anticipated depending on the conditions encountered.

One observation well would be drilled on each drill pad. A smaller drill rig would be utilized to drill the observation wells. Set-up and take-down of the drill rig would take an estimated 30 days each. The drilling of an observation well is estimated at 40 days. The actual durations of set-up, drilling, testing, and take-down would be affected by the conditions encountered, successful well test results, weather, scheduling, manpower and other factors that are encountered during the efforts. Upon successful completion of the testing of the first observation well, the drill rig would be relocated to the second well pad and the second observation well would be completed. Estimated durations for completion of the second observation well would be similar to the first observation well. Following the successful completion of both observation wells, the drill rig would be released.

Two full-size wells would be drilled on each drill pad. A larger drill rig would be utilized to drill the full-size wells. Set-up and take-down of the drill rig would take an estimated 30 days each. The drilling of a full-size well is estimated at 60 to 80 days. The actual durations of set-up, drilling, testing, and take-down would be affected by the conditions encountered, successful well test results, weather, scheduling, manpower and other factors that are encountered during the efforts. Upon successful completion of the testing of the first full-size well, the drill rig would be relocated to the second location on the same pad, or relocated to the second drill pad and the second well would be completed. Depending on well test results the third and fourth wells would be completed, relocating the drill rig between pads if necessary. Estimated durations for completion of the subsequent 3 full-size wells would be similar to the first full-size well. Following the successful completion of all four full-size wells, the drill rig would be released.

2.1.4 Site Access

The Project site is accessed by traveling northwest on US-6W/US-95N/Veterans Memorial Highway from Tonopah for approximately 34 miles to SR265 (NVCC 01994)/Nivloc Road (N-51529). Turn left onto SR265/Nivloc road and travel south-southeast for approximately 20 miles and turn left onto Silver Peak Road. Continue east-northeast on Silver Peak Road for approximately 1 mile.

Both well pads would be located adjacent to existing access roads (located on the evaporation pond berms, see Figure 2), and no new road construction would be necessary.

2.1.5 Water Requirements and Source

Water required for well drilling would come from the freshwater supply system associated with the nearby Rockwood lithium processing facility. Water required for grading, construction and dust control would be sourced from Rockwood's lithium processing facility which acquires water from wells located at SW1/4, NE1/4, Section 28 T.2S., R.39E.

One or more portable water tank(s) holding a combined total of at least 10,000 gallons would be maintained on the well sites during drilling operations during full-size well drilling. During observation well drilling, and as needed for dust control, water would be delivered by 2,000-3,000 gallon water trucks. It is anticipated that these trucks will either be rented or will be provided by the well driller.

Total water requirements estimated for the Project are shown below in Table 4.

Table 4: Water Use

Water Use	Well Type	Est. No. Drilling Days/Well	Est. Avg. Daily Water Use (gal/day)	Est. Water Use/Well (acre –feet)	No. Wells	Total Est. Water use (acre-feet)
Drilling	Observation	40	10,000 - 25,000	1.23-3.07	2	2.46 – 6.14
Drilling	Full-Size	60 - 80	10,000 – 25,000	1.84 – 6.14	4	7.37 – 24.55
Construction	n/a	365	10,000	11.20	n/a	11.20

Total estimated water use for the Project is assumed to be 21.03 – 41.89 acre-feet.

2.1.6 Aggregate Requirements and Source

Approximately 7,000 cubic yards of aggregate would be needed to surface the well pads.

Aggregate material consisting of sand and gravel would be obtained from Tonopah Sand and Gravel's Tonopah Airport Pit (N-80954), a pit under lease to Tonopah Sand & Gravel from the BLM. Aggregate materials to be obtained from Tonopah Sand & Gravel in the amount of 7,000 cubic yards is covered under EA/DR NV065-2003-055; no further NEPA analysis is necessary.

2.1.7 Surface Reclamation

A reclamation plan for the areas to be reclaimed is included as Appendix A. Following is a general description of reclamation activities.

If the wells constructed for this exploration project successfully encounter and prove a viable geothermal resource, they would remain in-place and be proposed for use in future geothermal development by Rockwood. If the wells are unsuccessful, they would be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM (see below).

After the well drilling and testing operations are completed, the liquids from the reserve pits would either naturally evaporate or be removed as may be necessary to reclaim the reserve pits. The solid contents remaining in each of the reserve pits, typically consisting of non-hazardous, non-toxic drilling mud and rock cuttings, would be tested to confirm that they are not hazardous. Typical tests may include the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311), tested for heavy metals; pH (EPA method 9045D); Total Petroleum

Hydrocarbons/Diesel (EPA Method 8015B); and Oil and Grease (EPA Method 413.1). If the test results indicate that these solids are non-hazardous, the solids would then be mixed with the excavated rock and soil and buried by backfilling the reserve pit. If test results indicate that these solids are hazardous, then the solids would be removed from the pit and disposed of at an appropriate approved disposal site.

If a well is judged by Rockwood to have no commercial potential, it may continue to be monitored for as long as useful information is obtained, but would eventually be plugged and abandoned (likely after 2 years) in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, which is designed to ensure that fluids would not move across these barriers into different aquifers. The well head (and any other equipment) would then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

As the well pads would be constructed within an existing evaporation pond, and consume a small percentage of the evaporation pond, they would not be reclaimed as the area is already heavily disturbed. Any stockpiled material, derived from construction of the reserve pit, would be used to fill the reserve pit once the fluids are no longer present .

2.1.8 Adopted Environmental Protection Measures

Rockwood would comply with all special lease stipulations attached to lease N-87008 (see Appendix B). In addition, Rockwood would also institute the following:

- Water would be applied to the disturbed ground during the construction and utilization of the drill pads and access roads as necessary to control dust.
- Portable chemical sanitary facilities would be available and used by all personnel during periods of well drilling and/or flow testing. These facilities would be maintained by a local contractor.
- Solid wastes (paper trash and garbage) generated by the operations would be transported offsite to an appropriate permitted landfill facility, likely the Tonopah landfill.

2.1.8.1 Fire Prevention and Control

All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the site. Water that is used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas, and they would be required to follow applicable BLM regulations regarding smoking. A fire response contingency plan is provided in the Operations Plan, Appendix A, subpart D.

2.1.8.2 Surface and Groundwater Protection

Geothermal fluids would not be discharged to the ground under normal operating conditions, except as identified in Section 2.1.3. Further, geothermal wells are cased to minimize the risks

of co-mingling of the geothermal fluids with underground aquifers. A spill and discharge contingency plan is provided in the Operations Plan, Appendix A, subpart F.

2.1.8.3 Wildlife Protection

Due to the lack of vegetation in the proposed area of disturbance no negative effects are expected to occur. When reserve pits and/or Pond 17W contain fluids, Rockwood would monitor for any wildlife takings of birds, and any takings would be reported to NDOW and the BLM. Also, should bird takings be identified during ongoing monitoring, Rockwood would utilize bird deterrence practices (i.e. air cannons).

Speed limits of 25 mph would be observed on all unpaved roads in the project area in order to minimize dust and avoid collision and incidental death of local wildlife.

2.1.8.4 Cultural Resource Protection

The construction of existing evaporation ponds, levees and roads has disturbed and modified the Area of Potential Affect (APE), making the probability of finding intact cultural properties negligible. A cultural survey and treatment of the APE would not be productive and is exempt from inventory requirements (Nevada State Protocol, 2009, section V.A.3.a.).

Rockwood employees, contractors, and suppliers would be reminded that all cultural resources are protected and if uncovered shall be left in place and reported to the Rockwood representative and/or their supervisor. Cultural issues would be covered during daily safety briefings.

If cultural resources (historic or prehistoric site or object) are discovered by Rockwood, or any person working on their behalf, on public or Federal land it shall be immediately reported to the Tonopah Field Office at (775) 482-7800. Rockwood would suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery would be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values.

2.1.8.5 Minimization of Air Pollution

As proposed surface disturbance is greater than 5 acres, a Surface Area Disturbance (SAD) permit would be needed from the Nevada Department of Environmental Protection – Bureau of Air Pollution Control (NDEP-BAPC). Rockwood would comply with any air quality requirements required by the NDEP-BAPC. Water would be applied to the ground during the construction of the drill pads and access roads as necessary to control fugitive dust.

Each well would be equipped with controls and alarms for detecting and warning of hazardous gas emissions (such as H_2S) from deep geothermal fluids. A hazardous gas contingency plan is provided in Appendix A, subpart C of the Operations Plan. These measures are required by the BLM for geothermal well drilling (43 CFR 3262.10 & 3262.11).

2.1.8.6 Minimization of Noise Pollution

To abate noise pollution, mufflers would be used on all drilling rig engines. Each well pad may have one rock muffler or an equivalent alternative noise abatement measure. Rock mufflers are approximately 30 feet tall with a diameter of about 10 feet and are used to attenuate steam venting noise during well testing.

2.1.8.7 Minimization of Hazards to Public Health and Safety

Construction and operation activities would be conducted in a manner to minimize the potential for creating any hazards to public health and safety. The emergency contingency plans contained in the Operations Plan, Appendix A include a section for Emergency Contact Numbers (subpart A and Attachment 2), Injury Contingency Plan (subpart C), Hazardous Gas Contingency Plan (subpart E), Fire Response Contingency Plan (subpart D), and Spill and Discharge Contingency Plan (subpart F).

2.1.8.8 Standard Operating Procedures for Geothermal Well Drilling

In addition to the adopted environmental protection measures listed above, the following Standard Operating Procedures (SOPs) would be implemented as part of the Project:

- The operator shall obtain and maintain all necessary State of Nevada and local permits applicable to drilling exploration drill holes.
- The reserve pit shall be fenced in conformance with the *Gold Book* (USDI and USDA 2007).
- Trash shall be contained onsite and hauled to an approved landfill. Burial of trash onsite is not permitted.
- Portable chemical toilets shall be used for human waste. Human waste may not be buried on site.
- Upon abandonment, the operator shall:
  - Remove all trash and debris from the site and disposed of it properly.
  - Re-contour the reserve pit to as near the original grade as possible, and spread any salvaged material over the covered pit and pad.
  - All reclamation of the disturbed areas shall be completed within 1 year from the date of the proper plugging and abandonment of the well. The Authorized Officer of the BLM shall be notified in writing when reclamation operations commence and when reclamation is complete and shall accept the reclamation in writing once a site inspection has been completed and verification that all reclamation has been successful.

2.2 ALTERNATIVES TO THE PROPOSED ACTION

NEPA requires that a reasonable range of alternatives to the Proposed Action be considered that could feasibly meet the objectives of the Proposed Action as defined in the purpose and need for the Project (40 CFR 1502.14[a]). The range of alternatives required is governed by a

rule of reason (i.e., only those feasible alternatives necessary to permit a reasoned choice need be considered). Reasonable alternatives are those that are practical or feasible based on technical and economic considerations (46 *Federal Register* 18026 [March 23, 1981], as amended; 51 *Federal Register* 15618 [April 25, 1986]).

Alternatives to the Proposed Action must be considered and assessed whenever there are unresolved conflicts involving alternative uses of available resources (BLM NEPA Handbook H-1790-1, page 79 (BLM 2008)).

Two alternatives to the Proposed Action were considered, and subsequently dismissed from further analysis: utilization of brackish water for well drilling, and utilization of an alternative renewable resource technology (i.e. wind or solar) instead of ultimately relying on geothermal power.

Utilization of brackish water for well drilling was dismissed from further consideration as brackish water would introduce an expected compositional variance resulting in the need to use increased levels of additives to the mud during drilling. Further, it has the potential to require longer drilling times, resulting in higher costs during the drilling phase of the Project.

Utilization of an alternative renewable resource technology was also considered, and subsequently dismissed from further analysis. At Project inception, Rockwood carefully considered renewable resource power options (such as solar or wind) as a means of providing power to their ongoing lithium operations. However, neither of these renewable technologies provide the consistent, baseload power that geothermal affords, and these other renewable options would offer a reduced return on investment.

Both of the above alternatives were considered and dismissed, and no unresolved conflicts regarding the Proposed Action have been identified to drive the creation of any alternatives that would still meet Rockwood's purpose for the proposed Project: to determine subsurface temperatures, confirm the existence of geothermal resources, and confirm the existence of a commercial geothermal reservoir at the proposed drill sites within the federal geothermal leases. Therefore, no alternatives (other than the No Action Alternative) are further analyzed in this EA.

2.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, the BLM would deny Rockwood's proposal to conduct the proposed Project on public lands and the DOE would not provide funds for this Project. The environmental effects from implementation of the proposed Project would not occur. The project area is within Rockwood's existing evaporation pond system, though the evaporation pond associated with the geothermal exploration Project is not currently in use. Should the No Action Alternative be selected, the area would continue to be used for Rockwood's lithium mining operations. Implementation of the No Action Alternative would not meet Rockwood's purpose and need for the proposed Project.

3. AFFECTED ENVIRONMENT

3.1 SUPPLEMENTAL AUTHORITIES

To comply with the NEPA, the BLM is required to address specific elements of the environment that are subject to requirements specified in statute or regulation or by executive order (BLM 2008). The following table outlines elements of the environment associated with supplemental authorities that must be addressed in all BLM environmental analyses, and indicates which elements, potentially affected by the Proposed Action, are analyzed in the EA (see Table 5). For the purposes of the analysis, the project area includes Rockwood's lease boundary shown in Figure 2.

Table 5: Resources Affected by the Proposed Action

Element	Present Yes/No	Affected Yes/No	Rationale
Air Quality	Yes	Yes	See discussions in Sections 3.3.1, 4.1.1, and 5.4.1.
Area of Critical Environmental Concern (ACEC)	No	No	The proposed Project is not located in or near any ACECs.
Cultural Resources	Yes	No	See discussion in Sections 3.3.2, 4.1.2 and 5.4.2.
Environmental Justice	No	No	The proposed Project was evaluated in accordance with Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. While there are minority and low-income populations in the vicinity, the proposed Project would not have a disproportionally adverse impact on these groups..
Fish Habitat	No	No	There is no fish habitat in the project area.
Floodplains	Yes	No	According to the FIRM, FEMA classifies the project area as unmapped (FEMA 2012). No river floodplains exist on the site; therefore no adverse impacts would occur to river floodplains.
Forest and Rangelands	No	No	There are no forested areas or grazing allotments in the project area.
Human Health and Safety	No	No	The proposed Project would not contribute to human health and safety concerns per Executive Order 13045, as very few children live within 1 mile from the proposed Project. Further, each well would be equipped with appropriately designed and installed "blow out" prevention equipment. Each well would also be equipped with controls and alarms for detecting and warning of hazardous gas emissions (such as H_2S and CO_2).
Noxious Weeds	No	Yes	See discussion in Sections 3.3.10, 4.1.10 and 5.4.10.
Migratory Birds	Yes	No	See discussion in Sections 3.3.7, 4.1.7, and 5.4.7.
Native American Religious Concerns	Yes	No	See discussion in Sections 3.3.3, 4.1.3, and 5.4.3.
Prime or Unique Farmlands	No	No	The proposed Project is not located in or near any prime or unique farmlands.
Threatened, and/or Endangered, Species (plants and animals)	No	No	See discussion in Section 3.3.8, 4.1.8 and 5.4.8.
Wastes, Hazardous or Solids	Yes	Yes	See discussion in Sections 3.3.4, 4.1.4, and 5.4.4.
Water Quality (Surface and Ground)	Yes	Yes	See discussion in Sections 3.3.5, 4.1.5, and 5.4.5.

Element	Present Yes/No	Affected Yes/No	Rationale
Wetlands and Riparian Zones	Yes	No	National Wetlands Inventory maps indicate the presence of a lake within the project area. This feature is part of the natural playa landform within the project area and surrounding region, which has been since modified into a series of brine ponds utilized by Rockwood for industrial processes. Because the existing playa within the project area is considered non-jurisdictional and the project area is located within a closed drainage basin, no impacts would occur to wetland resources protected under Section 404 of the Clean Water Act.
Wild and Scenic Rivers	No	No	The proposed Project is not located in or near any wild and scenic rivers.
Wilderness, Wilderness Study Areas (WSAs), Lands with Wilderness Characteristics	No	No	Wilderness or WSAs are not present within the project area or vicinity. The project area is substantially affected by human imprints, does not have opportunities for solitude or primitive recreation, and does not have an adequate size to contain land with wilderness characteristics. These elements are not further analyzed in this EA.

As outlined above, the following elements of the human and natural environment are not further analyzed in this EA: ACECs; Environmental Justice; Fish Habitat; Floodplains; Forests and Rangelands; Prime or Unique Farmlands; Human Health and Safety; Wetlands and Riparian Zones; Wild and Scenic Rivers; and Wilderness, Wilderness Study Areas, or Lands with Wilderness Characteristics.

3.2 OTHER RESOURCES

Other resources of the human and natural environment that have been considered for this EA and elements that may be affected are further described in the EA. Rationale for those elements that would not be affected by the Proposed Action and Alternatives is listed in Table 5 below.

Table 6: Other Resources Affected by the Proposed Action

Other Resources	Present Yes/No	Affected Yes/No	Comments
Minerals	Yes	Yes	See discussion in Sections 3.3.6, 4.1.6, and 5.4.6
Soils	Yes	No	The project area is heavily disturbed and no negative effects are expected to occur.
Vegetation	No	No	Due to the lack of vegetation in the proposed area of disturbance no negative effects are expected to occur.
Special Status Species	No	No	The closest special status species to the project area is the Eastwood milkweed, which is over 8 miles north. The project area is also heavily disturbed and covered with saline sediments and does not easily support life.
Wildlife Resources	Yes	Yes	See discussion in Sections 3.3.9, 4.1.9, and 5.4.9
Rangeland Management	No	No	The project area is not located within a grazing allotment.
Paleontological Resources	No	No	No outcrops of fossil-bearing strata have been identified in the area of potential effect.
Recreation	Yes	Yes	See discussion in Sections 3.3.11, 4.1.11, and 5.4.11
Visual Resources	Yes	Yes	See discussion in Sections 3.3.12, 4.1.12, and 5.4.12
Socio-Economic Values	Yes	Yes	See discussion in Sections 3.3.13, 4.1.13, and 5.4.13
Transportation and Access	Yes	No	The transportation of equipment, material, and drilling crews (See Table 2) would be distributed over the project life.

Other Resources	Present Yes/No	Affected Yes/No	Comments
			Environmental protection measures, which include a reduction in driving speeds (See discussions in Sections 2.1.8.3 and 4.1.1.), would mitigate effects. Due to the limited extent of traffic associated with the project, the distribution of deliveries, and reduced speeds for project associated traffic, the Proposed Action would not have adverse impacts on transportation, access, or public safety.
Land Use Authorization	Yes	Yes	See discussion in Sections 3.3.14, 4.1.14, and 5.4.14
Forestry	No	No	The project area is not located within forested areas.
Wild Horse and Burro	No	No	The project area is not located within a Herd Management Area.
Fire Management	No	No	The Project is not located within town boundaries. The project area is also heavily disturbed and covered with saline sediments and lacks vegetation.

As outlined above, the following other resources are not brought forward for further analysis in this EA: Soils; Vegetation; Special Status Species; Rangeland Management; Paleontological Resources; Transportation and Access; Forestry; Wild Horse and Burro; and Fire Management.

3.3 RESOURCES REQUIRING FURTHER ANALYSIS

3.3.1 Air Quality

Air quality in the project area has been designated as attainment/unclassified, which means it either meets or is assumed to meet the applicable federal ambient air quality standards, for all criteria air pollutants (EPA 2011). The Nevada Department of Conservation and Natural Resources (NDCNR) and the NDEP-BAPC have been delegated responsibility by both the federal EPA and the state of Nevada to regulate air pollution concentrations and the emissions of air pollutants in the project area. The project area is not located in or adjacent to any mandatory Class I (most restrictive) federal air quality areas, U.S. Fish and Wildlife Service (USFWS) Class I air quality units, or American Indian Class I air quality lands.

3.3.2 Cultural Resources

The construction of existing evaporation ponds, levees and roads has disturbed and modified the Area of Potential Affect (APE), making the probability of finding intact cultural properties negligible. A cultural survey and treatment of the APE would not be productive and is exempt from inventory requirements (Nevada State Protocol, 2009, section V.A.3.a.).

3.3.3 Native American Religious Concerns

Information sharing is on-going with the Death Valley Timbisha Shoshone Tribe of California, and will continue throughout the life of the Project. A letter describing the Project and offering the opportunity for consultation was sent via certified mail to the aforementioned Tribe on August 10, 2011. On January 3, 2012, a phone call was placed to the Tribe. Chairman George Gholson stated that the letter had been received, and that he had no comment or questions at this time. The Timbisha Shoshone Tribal representatives will be kept updated on all projects in the Clayton Valley area.

3.3.4 Hazardous Materials and Wastes

There are no hazardous material storage facilities in the project area and no hazardous materials are known to be routinely used in the project area.

3.3.5 Water Quality (Surface and Ground) and Water Quantity

The proposed Project is located within the Clayton Valley Hydrographic Area, designated as area 143 of the Central Region, Hydrographic Basin 10. The Clayton Valley Hydrographic Area covers 555 square miles. Clayton Valley is a topographically closed basin bounded by low to medium altitude mountain ranges. Clayton Valley is a graben structure. Seismic and gravity surveys reveal numerous horst and graben features with the basin deepening to the east-southeast. Extensive faulting has created hydrologic barriers resulting in the accumulation of lithium brines below the playa surface. Jennings (2010) states that satellite imagery and recent geological mapping identify several parallel north-south trending faults that are semi-permeable barriers separating the fresh water aquifer on the west from the brines beneath the playa. Stratigraphic barriers occur around much of the playa, isolating it from significant freshwater inflows originating in the mountains.

Recharge occurs as underflow into the basin from Big Smoky Valley in the north and Alkali Spring Valley in the west. Recharge derived from precipitation in the basin is low due to high evapotranspiration rates and low preciptiation.

Rockwood's water requirements for drilling 6 geothermal exploration wells (2 observation wells and 4 full sized wells) and for dust control totals approximately 21.03 – 41.89 acre-feet over the life of the Project (see Section 2.1.5). Water required for well drilling would come from the freshwater supply system associated with the nearby Rockwood lithium processing facility. Water required for grading, construction and dust control would also be sourced from Rockwood's lithium processing facility. This water is acquired from wells located at SW1/4, NE1/4, Section 28, T.2S., R.39E, and would be obtained via a waiver for the temporary use of ground water from the State Engineer's Office of the Nevada Department of Water Resources.

3.3.6 Minerals

The project area is currently used for Rockwood's lithium operations. Rockwood extracts lithium salts by brine evaporation. The brine is pumped from salt-rich aquifers beneath the desert and evaporated in large ponds on the desert surface. The concentrated brine is then pumped to a production plant where it is converted into lithium carbonate, the basic raw material for lithium compounds (Chemetall 2010). The proposed geothermal exploration Project is located within Rockwood's existing evaporation pond system.

There are 39 active placer mining claims within Sections 23 and 24, T.2S., R.39E. Rockwood is identified as the claimant on all 39 claims (BLM 2011a and 2011b).

3.3.7 Migratory Birds

A migratory bird, as defined by the Migratory Bird Treaty Act (16 USC 701-718h), is any species of bird listed in 50 CFR 10.13. This is generally considered any species of bird except upland game species, feral pigeons, European starlings, and English house sparrows. Provisions of the Migratory Bird Treaty Act prohibit the killing of any migratory birds, including the taking of any

nest or egg, without a permit. Executive Order 13186, titled *Responsibilities of Federal Agencies to Protect Migratory Birds*, was signed on October 1, 2001 to further enhance and ensure the protection of migratory birds.

Various species of raptors, which use diverse habitat types, may be present in the vicinity of the project area. American kestrel, bald eagle, barn owl, burrowing owl, Cooper's hawk, ferruginous hawk, golden eagle, great horned owl, long-eared owl, Merlin, northern goshawk, northern harrier, northern saw-whet owl, osprey, peregrine falcon, prairie falcon and red-tailed hawk, rough-legged hawk, sharp-shinned hawk, short-eared owl, Swainson's hawk, and turkey vulture have distribution ranges that include the project area. Furthermore, American kestrel, golden eagle, peregrine falcon, prairie falcon and red-tailed hawk has been directly observed in the vicinity of the project area (NDOW 2012). However, these species do not reside or forage in the project area given the heavily denuded nature of the existing evaporation pond.

3.3.8 Threatened or Endangered Species

Section 7(c) of the Endangered Species Act of 1973, as amended, requires federal agencies to consult with the USFWS concerning species listed under the Act. Consistent with this requirement and the applicable general stipulations appended to the leases (see Section 2.1.8), on June 6, 2011 a letter requesting information regarding threatened and endangered species which may occur in the sections comprising the project area was sent to the USFWS. The USFWS responded in a letter dated July 5, 2011 that, to the best of their knowledge, no listed, proposed or candidate species existed in the project area (USFWS 2011).

3.3.9 Wildlife Resources

A variety of wildlife species may occur within the project area vicinity. Common wildlife known to inhabit the area include coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), badger (*Taxidea taxus*), chukar (*Alectoris chukar*), and several different lizard, snake, raptor, and migratory bird species (BLM 2011c).

Bighorn sheep and mule deer distributions exist outside of the project area in the Silver Peak Range in the northwestern portion of the three-mile buffer area. There are no known elk or pronghorn antelope distributions in the vicinity of the project area, nor are there greater sage-grouse distributions or leks in the vicinity of the project area (NDOW 2012).

3.3.10 Noxious Weeds

Noxious weeds and invasive species are typically nonnative plants that infest and/or invade areas of fresh soil/ground disturbance. Noxious weed species typically have attributes which allow them to rapidly out-compete native vegetation for vital natural resources. Noxious weeds, invasive and nonnative species impact native ecosystems by reducing overall biodiversity, by altering local hydrologic and soil characteristics and can immediately increase fire intensity. On a smaller scale, noxious weeds interfere with native plant successional pathways by competing for pollinators, being prolific seed producers and inundating the surrounding soil with weed seed, displacing rare plant species, serving as reservoirs of plant pathogens and converting complex plant communities into simple plant communities.

Noxious weed, invasive and nonnative species seed or vegetative plant parts are carried, transported or deposited into and infest weed-free areas by people, equipment, livestock/wildlife or by abiotic means (wind, water).

As of 2011, the State of Nevada under Nevada Administrative Code 555.010 listed 47 species on the Nevada Noxious Weed List.

The project area is within an existing series of evaporation ponds and is heavily disturbed and covered with saline sediments. No noxious weeds are currently present within the project area. The potential for the presence of invasive, nonnative species is low.

3.3.11 Recreation

There are no designated trails or developed recreational facilities in the project area. The nearest undeveloped recreation site is Clayton Valley Sand Dunes, located several miles south of the project area. Dispersed recreation activities occur in the vicinity and primarily include OHV use and camping.

3.3.12 Visual Resources

The project area is within the Great Basin section of the Basin and Range Province and characterized by linear desert mountains, separated by large desert plains, and dominant stands of low-growing vegetation such as sagebrush and yucca. In the specific project area, the well pads are located within an existing evaporation pond, and the area is heavily disturbed and covered with saline sediments.

Modifications in the vicinity that affect the natural landscape include a sprawling lithium mining operation (Rockwood's lithium mine) and electrical transmission and distribution lines.

The BLM initiated the visual resource management (VRM) process to manage the quality of landscapes on public land and to evaluate the potential impacts to visual resources resulting from development activities. VRM class designations are determined by assessing the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of the viewer to the subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. They are divided into four levels (Classes I, II, III, and IV). Class I is the most restrictive and Class IV is the least restrictive (BLM 1986).

The proposed project area is located in a VRM Class IV area (Seley 2011). The objective of Class IV is to provide for management activities that require major modification to the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. Every attempt, however, should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements (BLM 1986).

3.3.13 Socio-Economic Values

The project area is located in Esmeralda County. As of the year 2010, Esmeralda County had a total population of 783 (BLM, BMDO 2011). The closest Census Designated Places (CDPs) to the project area are the city of Tonopah, in adjacent Nye County, having a year 2010 population of 2,478 (U.S. Census Bureau 2011) and the community of Silver Peak, having a year 2010 population of 107 (U.S. Census Bureau 2012).

As of 2009, Esmeralda County had 860 housing units. Approximately 52 percent of these units were occupied (BLM, BMDO 2011). The Tonopah CDP had 1,576 housing units, of which approximately 66.8 percent of these units were occupied. (U.S. Census Bureau 2011). The Silver Peak CDP had 133 housing units, of which 41.4% were occupied (U.S. Census Bureau 2012).

The total employment (2005-2009) for Esmeralda County was estimated to be 399 persons. Esmeralda County's leading employers included the agriculture/forestry/fishing and hunting/mining industries (25.8 percent), and public administration (16.5%) (BLM, BMDO 2011). The labor force for the Tonopah CDP was estimated in the year 2010 to be 1,308 persons. The Tonopah CDP leading employers included the service occupations (35.2 percent); management, business, science and arts (23.8 percent); and natural resources, construction and maintenance occupations (26.9 percent); and the sales and office occupations (18.3 percent) (U.S. Census Bureau 2011). The U.S. Census provided a "2006-2010 American Community Survey 5-Year Estimate" for the Silver Peak CDP which estimated that 121 people were in the labor force with a +/-52 person margin of error (U.S. Census Bureau 2012).

3.3.14 Land Use Authorization

The project area is on public lands managed by the BLM. The proposed Project would be located within Rockwood's existing evaporation pond system. Land use within the vicinity of the proposed geothermal exploration wells includes existing access roads, power lines, industrial/extraction operations, and additional geothermal exploration activities.

Ten BLM authorizations have been granted within Sections 23 and 24, T.2S., R.39E.; these authorizations include:

- N-42582, a 10,710.94 acre site to Foote Mineral Company for lithium brine extraction;
- N-72542, a 620 acre site to Chemetall Foote Corporation for lithium extraction;
- N-02169, a 7.49 acre ROW to Sierra Pacific Power Company for a power transmission line;
- N-02552, a 0.12 acre ROW to Sierra Pacific Power Company for a power transmission line;
- N-51529, a 27.27 acre road ROW to Homestead Minerals;
- N-87008, a 900-acre geothermal lease to Chemetall Foote Corp.;
- N-89289, a 0.5 acre area to Chemetall Foote Corp. for geophysical exploration;
- N-89442, a 42.15 acre road ROW to the Esmeralda County Road Department;
- Nev 0043264, a 2,127.14 acre ROW to Sierra Pacific Power Company for a power transmission line; and
- Nev 0066325, a 4.591 acre site to Foote Mineral co. for plant watering.

4. ENVIRONMENTAL CONSEQUENCES

4.1 PROPOSED ACTION

4.1.1 Air Quality

The primary pollutant of concern during construction activities would be particulates in the form of fugitive dust, which would be generated during earth-moving activities and travel on unpaved roads during construction and drilling activities. Based on implementation of environmental protection measures specified by Rockwood, water would be applied to the ground during the construction and utilization of the drill pads and access roads as necessary to control dust and speed limits of 25 mph would be observed on all unpaved roads in the project area in order to minimize dust (see Section 2.1.8). These measures would minimize fugitive dust emissions during construction and drilling activities. Assuming watering twice per day, fugitive emissions of fine particulate matter (PM_{10}) from well pad construction would be about 2 pounds per day. Fugitive PM_{10} emissions from workers and trucks driving on the unpaved roads during well drilling and testing activities would average about 60 lbs/day.

A SAD Permit, which documents the areas of proposed disturbance and the best practical dust control methods to be used, will be required for the Project as the amount of surface disturbance would be greater than 5 acres (see Section 2.1.8.5). Implementation of the applicable best practical dust control methods, through compliance with the SAD Permit would minimize fugitive dust emissions during construction and operation of the Project.

Combustion emissions of criteria air pollutants [nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and particulate matter less than or equal to 10 microns in diameter (PM_{10})], criteria air pollutant precursors [volatile organic compounds (VOCs)] and air toxics (small quantities of diesel PM, acetaldehyde, benzene, and formaldehyde) would be released during well drilling and construction activities from the diesel engines used. Estimated combustion emissions for well drilling and well pad construction activities are provided below in Table **7**.

Table 7: Combustion Air Pollutant Emissions

Activity	Emissions (lbs/day) Controlled					
	PM_{10}	$PM_{2.5}$	SO_2	CO	NO_X	VOC
Well Pad Construction	1.13	1.09	0.02	23.75	19.17	2.71
Observation Well Drilling	15.48	14.24	0.14	326.72	263.67	37.26
Full-Size Well Drilling	21.43	19.71	0.19	452.38	365.08	51.59

Small quantities of naturally occurring non-condensable gases, such as carbon dioxide (CO_2), hydrogen sulfide (H_2S), nitrogen (N_2), and methane (CH_4), would be emitted to the air during geothermal well testing. Each well would be equipped with controls and alarms for detecting and warning of hazardous gas emissions (such as H_2S) from deep geothermal fluids. A hazardous gas contingency plan is provided in Appendix A, subpart C of the Operations Plan. These measures are required by the BLM for geothermal well drilling (43 CFR 3262.11). Carbon dioxide and methane are greenhouse gases. Although the Proposed Action would contribute an increase in greenhouse gases in the atmosphere, these emissions would be extremely small relative to state, national, and global greenhouse gas emissions. Any resultant effects would also be extremely small and cannot be reliably estimated.

The proposed Project is not expected to contribute to any violation of federal or Nevada ambient air quality standards and no residual air quality impacts are expected because there would be no further fugitive dust or combustion emissions once activities ceased.

4.1.2 Cultural Resources

Rockwood employees, contractors, and suppliers would be reminded that all cultural resources are protected and if uncovered shall be left in place and reported to the Rockwood representative and/or their supervisor. As a condition of the GDP, cultural issues would be covered during daily safety briefings. BLM would review the content of the daily briefings to ensure that the protection of cultural resources is discussed.

If cultural resource (historic or prehistoric site or object) are discovered by Rockwood, or any person working on their behalf, on public or Federal land it shall be immediately reported to the Tonopah Field Office at (775) 482-7800. Rockwood would suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery would be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values.

4.1.3 Native American Religious Concerns

To date, the Timbisha Shoshone Tribe has not expressed any concerns about this Project. There are no known Native American religious concerns associated with the proposed Project.

During the project activities, if any cultural properties, items, or artifacts (stone tools, projectile points, etc.) are encountered, it would be stressed to those involved that such items are not to be collected. As a condition of the GDP, cultural issues would be covered during daily safety briefings. BLM would review the content of the daily briefings to ensure that the protection of cultural resources is discussed. Cultural and Archaeological resources are protected under the Archaeological Resources Protection Act (16 USC 470ii) and FLPMA (43 USC 1701). The above language is applicable to previously identified artifacts and site locations, surface artifacts possibly missed during the original survey, and any subsurface artifacts (below ground).

Though the possibility of disturbing Native American grave sites within most project areas is extremely low, inadvertent discovery procedures must be noted. In accordance with the Native American Graves Protection and Repatriation Act, Section (3)(d)(1), Rockwood would notify the BLM in writing of such a discovery. If the discovery occurs in connection with an authorized use, the activity, which caused the discovery, is to cease and the materials are to be protected until the land manager can respond to the situation.

If any traditional cultural properties or artifacts are identified before or during exploration activities, a protective “buffer zone” may be acceptable, where physical avoidance is an issue, and if doing so satisfies the needs of the BLM, the proponent, and affected Tribe. The size of any “buffer zone” would be determined through coordination and communication between all participating entities.

If, as a result of the Project, additional drilling is proposed or a development plan is submitted to the Tonopah Field Office, BLM would again initiate communication and coordination with the Death Valley Timbisha Shoshone Tribe of California or any other Tribe(s) who demonstrate an interest in any geothermal development/production within this specific area.

4.1.4 Hazardous Materials and Wastes

Diesel fuel, lubricants, hydraulic fluids and drilling chemicals (drilling mud, caustic soda, barite, etc.) needed for the Project would be transported to the drill site on trucks and stored on pallets or in tanks, drums, or buckets, subject to applicable federal and state regulations

Materials and chemicals commonly used during well drilling are shown in Table 3 (see Section 2.1.3). The storage and use of these materials may result in minor, incidental spills. The proposed Project includes a hazardous material spill and disposal contingency plan that describes the methods for cleanup and abatement of any petroleum hydrocarbon or other hazardous material spill. These contingency plans are also attached to the GDP and are required as conditions of approval. Further, the Project is located within an existing bermed evaporation pond, so in the event of a materials spill, it is unlikely that any spilled materials would overtop the berm and result in offsite impacts.

Many of the materials used during drilling are also flammable. Rockwood has developed an Emergency Fire Response/Preparedness and Action Plan that addresses mitigation of hazards and effective response. The goals of this plan are to protect personnel, the public and the environment and to protect the assets of Rockwood. The elements of the Emergency Fire Response/Preparedness and Action Plan include employee training in emergency notification and communication, rescue and medical response, evacuation, accountability, fire prevention and control, hazardous materials management, and working within the local authorities and Incident Command Structure.

The proposed Project would comply with BLM requirements to ensure that any geothermal fluid encountered during the drilling does not flow uncontrolled to the surface. These include the use of blow-out prevention equipment during drilling and the installation of well casing cemented into the ground. Each well would be equipped with appropriately designed and installed blow-out prevention equipment, as required by the BLM (43 CFR 3261.13 & 3262.10). Specifications of blow-out prevention equipment and action plans are required as a condition of approval for the BLM Geothermal Drilling Permit for each well

After drilling operations are completed, the liquids from the reserve pits would either naturally evaporate, or be removed as may be necessary to reclaim the reserve pits. Removed fluids would be taken to a facility designed to accept such waste. The non-hazardous, non-toxic residual solid contents of the pits would be mixed with the excavated rock and soil and buried by backfilling the reserve pit. The small quantities of solid wastes (paper trash and garbage) generated by the proposed Project would be transported offsite to an appropriate permitted landfill facility, likely the Tonopah landfill. Portable chemical toilet wastes would be removed by a local contractor. Because of these waste containment and disposal practices, no impacts are anticipated to result from solid or hazardous wastes generated by the proposed Project. The disposal of these wastes would be a residual effect of the proposed Project.

4.1.5 Water Quality (Surface and Ground) and Water Quantity

Records of water surface elevations of wells in the fresh water aquifer demonstrate a decline over time. This indicates withdrawals are exceeding recharge. There has been concern over the rate of decline of the fresh water aquifer. A 1998 study by Cyprus Foote Mineral Co. conducted two analyses of the fresh water aquifer: 1) a static/pumping water level decline analysis over time, and 2) a volumetric analysis. The study assumed that brine water exist at the 4200 foot

elevation. Potable water was found as deep as 3980 feet [above sea level] (Jennings 2010). The study determined that at the then current rate of decline, 1.25 feet/year, the fresh water aquifer had a life of 27 years. The volumetric analysis predicted a life of 14 years. It should be noted that the volumetric analysis did not account for recharge to the fresh aquifer. The volumetric analysis was updated to include recharge. The assumed life of the fresh water aquifer was then calculated to be approximately 27 years.

A study of the fresh water aquifer conducted by Jennings (2010) based on data from 1998-2010 determined the rates of decline for the Rockwood wells at 0.5 feet/year, Silver Peak Well 1 at 0.17 feet/year and the Rockwood monitoring well (2002-2010) at 0.27 feet/year. The report states that pumping rates are directly related to production of lithium and in recent years lithium production rates have declined.

Analysis of pumping and water surface elevation data for the Silver Peak wells and Rockwood supply and monitoring wells indicate that the additional water required by Rockwood, 21.03 – 41.89 acre-feet (7.01 – 13.96 acre-feet/year) over the anticipated 3-year life of the exploration Project, would increase the rate of decline of the fresh water aquifer. The estimated decrease in water surface elevations in the fresh water aquifer was calculated as approximately 0.02 – 0.04 ft/year over the life of the Project.

This analysis is based on Rockwood pumping and water surface elevation data for 2000-2010, the period for which data was available. A second analysis involved using a modified version of the volumetric analysis in the 1998 report. The volumetric analysis requires assumption regarding the lateral extent and specific yield of the aquifer. The aquifer is conceptualized as a homogeneous block. The analysis included recharge based on PRISM precipitation data and methods described in Eakin et al (1951).

In an effort to protect water resources, the following applicant committed practices would be utilized:

- Each observation and full-sized well would be cased with steel casing cemented into the ground, which is designed to prevent contamination of any groundwater by the geothermal fluid and prevent the loss of any geothermal resource into other aquifers.

- Each observation and full-sized well would be drilled using non-toxic drilling mud to prevent loss of substantial drilling fluids into the rock.

- Reserve pits would be constructed at each site for the containment and temporary storage of drilling mud, drill cuttings and storm water runoff from the constructed well pad. The well driller would maintain a minimum of two feet of freeboard at all times in the reserve pits.

- Any injection test conducted on the exploration wells would only inject produced geothermal fluid through the cased well back into the geothermal reservoir from which it originated, ensuring that there would be no affect on the quality of groundwater. Chemical analyses of the produced geothermal fluid would be conducted to characterize the geothermal fluids.

Figure 2 shows that the proposed well pads are located within dikes. These well pads would be constructed using aggregate resulting in the pads being elevated up to 3 feet above the grade of the ponds. Most precipitation falls in the mountains with surface runoff being collected and routed through ephemeral stream channels to the playa. In the event that storm runoff reached

the valley floor, the dikes surrounding the well pads would prevent them from receiving this runoff. No impacts from storm water runoff are anticipated.

Precipitation from storms can fall directly within the diked area. The possibility of the pads flooding as a result of direct rainfall is extremely low. NOAA point precipitation frequency estimates for the 100 year event in the area of the pads are: 15 minutes = 0.658 inches, 30 minutes = 0.886 inches, 60 minutes = 1.1 inches. In the unlikely event that water within the diked area threatens to flood the well pads, the water will be pumped to other nearby evaporation ponds or to the playa. No impacts from a 100-year rainfall event are anticipated.

4.1.6 Minerals

Rockwood holds placer mining claims to lithium in 39 parcels of land at and near the proposed project site as well as the geothermal lease for the proposed project. Other parties have acquired mineral claims or geothermal leases in the vicinity of the proposed project.

The possibility and rate of heat recovery in the proposed target zone for this project has not been determined. The geothermal exploration under the Proposed Action aims to better characterize the resource and the potential for its development. Under the Proposed Action, well drilling and geothermal testing would be limited to the project area and the subsurface directly beneath it. There is little potential for the well drilling and testing to affect other mineral claims or geothermal leases in the immediate vicinity of the project.

4.1.7 Migratory Birds

No direct effects to migratory birds are anticipated given the nature of the project area and the lack of existing habitat.

Noise and other indirect effects associated with construction and drilling could keep some migratory birds away from areas containing these activities. The indirect effects would be temporary and short-term, given the temporary nature of the proposed Project. No impacts are anticipated. See also Section 2.1.8.3 for a description of adaptive management techniques which would be utilized should monitoring demonstrate that there are impacts to migratory birds.

4.1.8 Threatened or Endangered Species

There would be no impacts to threatened or endangered species, as they are not known to exist within the project area.

4.1.9 Wildlife Resources

No direct effects to wildlife resources are anticipated given the nature of the project area and the lack of existing habitat.

Noise and other indirect effects associated with construction and drilling could keep some wildlife away from areas containing these activities. The indirect effects would be temporary and short-term, given the temporary nature of the proposed Project. No impacts are anticipated.

4.1.10 Noxious Weeds

The selected drill sites are located within an existing evaporation pond on land that is heavily disturbed and covered with saline sediments. Invasive, noxious, and non-native species are currently not present and their growth is not expected. Given the composition of the evaporation ponds and the lack of productive soil, the area does not easily support life. The potential for establishment of invasive, nonnative species onsite is low.

As weeds and invasive species could also be introduced by construction equipment brought to the project from infested areas or by the use of seed mixtures or mulching materials containing weed seeds, Rockwood has committed to cleaning the undercarriages of heavy equipment prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species. Further, Rockwood has committed to monitor the project area for noxious weeds over the life of the project. These commitments are documented in the completed reclamation plan (see Appendix A). Mitigation measures have also been recommended to ensure that these commitments are adhered to (see Section 6).

4.1.11 Recreation

As there is no recreational use within the proposed project area, impacts to recreational users are not anticipated.

4.1.12 Visual Resources

The total estimated area of new surface disturbance required for construction of the drilling pads would be approximately 5.6 acres.

During the approximately 40 day observation well drilling process, the top of the drill rig derrick would be about 60 feet above the ground surface (depending on the drill rig used). During the approximately 60-80 day drilling process for each full-size well, the top of the drill rig derrick would be approximately 180 feet above the ground surface. Drilling would be conducted 24-hours a day, so that the lights used when drilling at night could be visible at a distance. Mitigation measures have been recommended to reduce the visual impacts related to nighttime lighting of the Project (see Section 6). Following implementation of this mitigation, impacts would be minimal.

The Proposed Action would be consistent with the Class IV VRM classification of the area. Impacts to visual resources would be temporary and would primarily affect the elements of line and color. As the well pads are proposed within an existing evaporation pond and the area is already heavily disturbed, the potential for visual impacts would be low.

4.1.13 Socio-Economic Values

The construction and drilling workforce is expected to average up to 12 and 25 workers for the observation and full-sized well drilling, respectively. Drilling of each observation well is anticipated to require approximately 40 days; drilling of each full-sized well is anticipated to require approximately 60-80 days. Some of these workers may be recruited locally, though most would be specialized workers from outside of the local area. Typically, non-local skilled workers

do not bring families with them on short-term projects. It is anticipated that the drilling supervisor and mud logger would live in a trailer on site, thus reducing potential need for localized accommodations.

The proposed Project is short-term and temporary and would not cause population growth in the area. The proposed Project would neither create nor provide any infrastructure that would indirectly cause substantial population growth.

Non-local construction and drilling workers typically are paid a *per diem* rate for daily housing and meal costs. Workers normally spend the *per diem* on motel accommodations or recreational vehicle campground space rent, restaurants, groceries, gasoline, and entertainment. In addition, Rockwood likely would rent some portion of the equipment and supplies required to drill and complete the wells (such as grading equipment, fuel and tools) from local suppliers. Aggregate would be purchased from Tonopah Sand and Gravel. This spending activity associated with the proposed Project construction and drilling would have a positive effect on local businesses in Esmeralda and Nye Counties.

4.1.14 Land Use Authorization

Project facilities would be located away from existing authorizations as identified in Section 3.3.14, and impacts to land use are not anticipated. However, holders of the existing rights-of-way within the vicinity of the proposed Project would be notified of the proposed activities. Rockwood would coordinate their activities with the existing holders as necessary and would obtain required authorizations or permits.

4.2 THE NO ACTION ALTERNATIVE

Under the No Action alternative, the Silver Peak Area Geothermal Exploration Project as currently proposed would not be constructed or operated. The direct and indirect impacts identified for the Proposed Action would not occur. The area would continue to be used as an evaporation pond for Rockwood's lithium mining operations. The existing environmental conditions for all identified resources would remain as described in Sections 3.3.1 through 3.3.14. .

5. CUMULATIVE IMPACTS ANALYSIS

The CEQ regulations for implementing NEPA (40 CFR 1508.7) define cumulative impacts as:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The following analysis identifies other past, present, or reasonably foreseeable future actions that, together with the proposed Project, may incrementally impact the environment, and addresses the potential cumulative impacts of these actions and the proposed Project.

5.1 CUMULATIVE EFFECTS STUDY AREA

The Cumulative Effects Study Area (CESA) for socioeconomic impacts is Esmeralda County and portions of Nye County, particularly the Tonopah Census Designated Place.

The CESA for the remaining resources analyzed in this EA is the Clayton Valley Hydrographic Area (Number 143) of the Central Hydrographic Region (Number 10), as designated by the Division of Water Resources of the Nevada Department of Conservation and Natural Resources (NDCNR-DWR). This hydrographic area totals 380,800 acres (Figure 4).

5.2 PAST AND PRESENT ACTIONS

Past and present activities consist principally of mineral exploration and production activities; geothermal exploration drilling; livestock grazing; and dispersed recreation.

The CESA contains the community of Silver Peak, which is approximately 1 mile west of the project area. The 2006 population of Silver Peak was approximately 117 persons (Esmeralda County 2010).

At various times for more than 100 years, the Silver Peak area has been investigated for precious metals, lithium, potash, water resources, and geothermal resources. This has led to the drilling of a number of wells and small-diameter holes within the CESA, including Rockwood's leasehold.

Blair, now a ghost town, is located 3 miles north of Silver Peak. The site of Blair was established in 1906 when the Pittsburg Silver Peak Gold Mining Company constructed the Blair mill, a 100-stamp mill, in operation from 1907 through 1916.

Rockwood (N-72542) and its predecessor entities currently operate a lithium brine mining and processing facility in the area, and have been extracting lithium from the playa brines since 1965. Rockwood and its predecessor entities have drilled a number of wells within the Clayton Valley basin where the Project is proposed. In September 2010, the DOE approved an Environmental Assessment which, in part, authorized the expansion of the current lithium brine production and processing by reworking some existing brine production wells, installing new production wells, dredging and expanding the current evaporation pond system and refurbishing

an existing lithium carbonate plant (DOE, NETL 2010). These activities are underway and completion is anticipated by late March 2013.

There are three active authorized geothermal exploration projects with the CESA. Sierra Geothermal Power (SGP) received BLM approval of the Silver Peak Geothermal Exploration Project in April 2008 to drill up to 14 temperature gradient holes and up to 6 slim wells and 6 full-sized wells within the Silver Peak leases. These leases surround the community of Silver Peak and extend northward approximately five miles. To date, only one geothermal well located approximately 1.7 miles northwest of the proposed project has been constructed on the Silver peak leases. In July 2009, SGP received BLM approval of the Alum Geothermal Exploration Project to drill 32 temperature gradient holes and 17 observation wells within their Alum leases, which are located approximately 11 miles north of the proposed project. To date, two geothermal wells have been drilled on the Alum leases. SGP has since been purchased by Ram Power.

In April 2011, Ram Power received BLM approval of the Clayton Valley Geothermal Exploration Project to drill up to 18 geothermal exploration wells within their Clayton Valley leases, located from 2 to 9 miles north and east of the proposed project. To date, no geothermal wells have been drilled on these leases.

Six miles northwest of Silver Peak, Golden Phoenix Minerals (N-73109) operates the Mineral Ridge Gold Mine within the CESA. The mine is currently working on a heap leach pad, crushing ore, and preparing to begin leaching. The mine has submitted a Mine Plan of Operations amendment to include exploration drilling. The Sunshine Mining Company previously produced ore from the Mineral Ridge Mine, and from Sixteen-to-One Mine in the CESA, 13 miles west southwest of Silver Peak.

Sand, gravel, and stone are produced within the CESA. The Goat Island quarry produces ballast to line Rockwood's pond boundaries and sand and gravel are produced from both south and north of Silver Peak along SR 265.

5.3 REASONABLY FORESEEABLE FUTURE ACTIONS

For this analysis, it is assumed that the foreseeable future is the approximate 3-year period for implementation of the Proposed Action plus a subsequent 3-year period for the completion of reclamation. It is assumed that recreational activities, livestock grazing, and mineral exploration activities associated with the CESA would continue into the reasonably foreseeable future, though the relative intensity of these actions could vary depending on a variety of factors, such as a sluggish economy. Given that the reasonably foreseeable future period is a three year window, it is assumed that the reasonably foreseeable future actions will continue in the same manner and to the same degree as they have been conducted in the present and recent past

Section 368 of the Energy Policy Act of 2005 directs the Secretaries of Agriculture, Commerce, Defense, Energy and the Interior (the agencies) to, under their respective authorities, designate corridors on federal land in the 11 Western States for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). On November 16, 2007, the Agencies released for public review and comment a Draft Programmatic Environmental Impact Statement (Draft PEIS) addressing the environmental impacts from the Proposed Action and a range of alternatives. Detailed maps show that an energy corridor is proposed within the CESA.

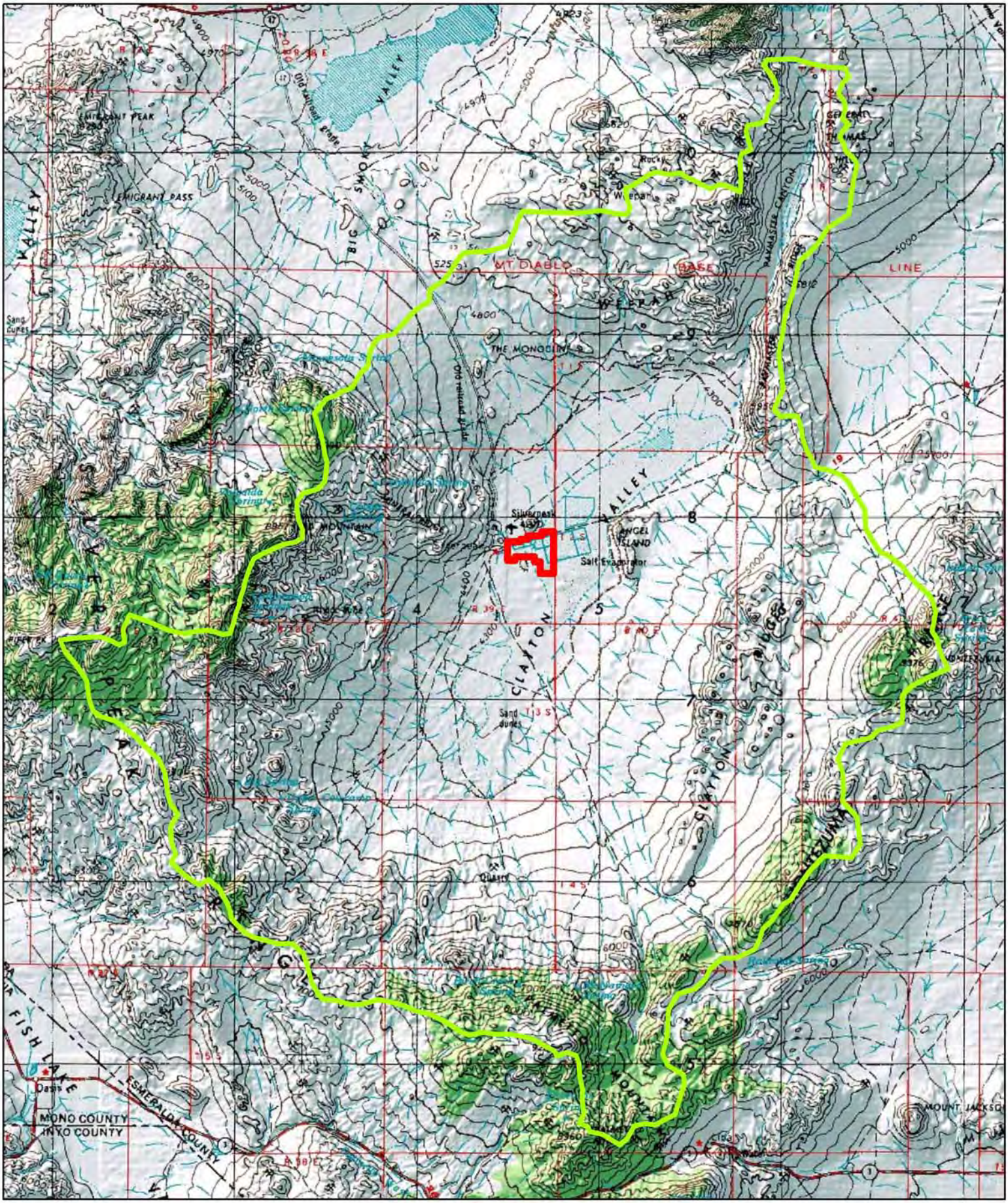


Figure 4 : Cumulative Effects Study Area

Lease Boundary

Hydrographic Area Boundary

0 2.5 5 Miles

United States Department of the Interior
Bureau of Land Management
Tonopah Field Office
P.O. Box 911
Tonopah, NV 89049

The data shown on the map uses the Universal Transmercator (Zone11N) Coordinate system and uses the NAD83 projection.

Map Date: 04/20/2012

The Mineral Ridge Mine, located 5 miles northwest of Silver Peak has filed a Mine Plan of Operations amendment to include exploration drilling and is currently undergoing NEPA evaluation.

Rockwood has been approved to drill temperature gradient holes.

Rodinia Lithium Company has submitted a Plan of Operations to the Tonopah Field Office for lithium exploration wells north and south of Rockwood.

Geoxplor currently has a pending notice N-89179 to drill for lithium.

There are no other known or anticipated actions with the potential for creating additional cumulative impacts in the reasonably foreseeable future. All future projects proposed within the CESA would be analyzed in separate site-specific environmental analyses.

5.4 CUMULATIVE IMPACTS FOR THE PROPOSED ACTION

5.4.1 Air Quality

Fugitive dust would be generated from any surface-disturbing activities and travel on unpaved roads during exploration activities. Mineral exploration activities and the expansion work currently underway at Rockwood's lithium mine typically minimize fugitive dust by watering the disturbed ground, as necessary. The operation of diesel engines associated with these same activities would also emit small quantities of criteria air pollutants (NO_2, SO_2, CO, and PM_{10}), criteria air pollutant precursors (VOCs), and air toxics (small quantities of diesel PM, acetaldehyde, benzene, and formaldehyde). These emissions are temporary and the air quality standards for this area are not expected to be exceeded. Any cumulative impacts to air quality are anticipated to be negligible.

5.4.2 Cultural Resources

As the Project would have no effect on cultural resources, the Project would not contribute to any cumulative impacts to cultural resources.

5.4.3 Native American Religious Concerns

As no Native American religious concerns were identified for the proposed Project, the Project would not contribute to any cumulative impacts to Native American religious concerns.

5.4.4 Hazardous Materials and Wastes

The Proposed Action would include generation and proper disposal of solid and hazardous wastes. The Project could also result in minor petroleum hydrocarbon or other hazardous material spills. However, no soil, groundwater or surface water contamination is anticipated. No adverse effects to the environment or worker health and safety are anticipated.

Hazardous materials are expected to be used by both the non-renewable and renewable future mineral exploration activities (including Rockwood's lithium mining operations and the activities associated with their expansion and work over efforts). This includes the use of petroleum fuels

(principally diesel fuel), hydraulic fluid, lubricants and drilling chemicals and materials. Non-hazardous solid waste and liquids could also be generated by the other reasonably foreseeable future actions.

Cumulative effects to the environment from hazardous or solid wastes are expected to be negligible.

5.4.5 Water Quality (Surface and Ground) and Water Quantity

Currently, Rockwood and the Town of Silver Peak are pumping from the fresh water aquifer. Projects within the CESA which have the potential to decrease the water level in the aquifer are shown in Table 8 below.

Table 8 Effects of Pumping to Aquifer

		Acre-feet/year	Approximate Decrease Water Level (feet/year)
1	Jennings (2010) 1998-2010	Not Reported	0.4
2	Rockwood Geothermal Exploration	7.01 – 13.96	0.02 – 0.04
3	Clayton Valley Geothermal Exploration Pjt.	67	0.2
4	Rockwood Additional Pumping	160	0.5
5	Lithium Exploration (Rodinia and Geoxplor)	11	0.04
6	Proposed Increases	245.01 – 251.96[1]	0.76 – 0.78[1]
	Cumulative Total	503.92	1.18[2]

1 This represents the total of lines 2-5.
2 This represents the total of lines 1 and 6.

Any rate of pumping that exceeds the rate of recharge of the fresh water aquifer would decrease the amount of fresh water stored in the aquifer. Increasing the rate of withdrawal would shorten the life of the aquifer as a potable water supply.

Rockwood's withdrawal of water would lower the water surface elevation of the aquifer approximately 0.02 – 0.04 feet/year over the life of the Project, which represents less than 1% of the total water pumped based on data for the period 1998-2010. This represents a negligible impact on the operation of the Rockwood or Silver Peak wells. The reduction in water surface elevations as result of this project would not result in an increase in the cost of pumping or resetting the pump intakes. Water surface elevations would remain well above the bottoms of the well screens.

There is little water quality data available for the Silver Peak wells. Data on Total Dissolved Solids (TDS) was first collected on 8/14/2006. The TDS was measured at 680 mg/l (pumping ~ 34 gpm). A constant discharge pump test, 250 gpm, was conducted in October 2009. The measured TDS was 719 mg/l. The next test result available, 9/07/2010, showed a TDS of 690 mg/l. It appears that TDS levels dropped with a reduction in pumping. The TDS levels did not exceed the Nevada standard, 1000 mg/l. Based on these few water quality data and given the continued current and reasonably foreseeable future pumping of water from the aquifer, it is probable that water quality will decline over time. However, the minimal increase of 42 acre-feet at the proposed pumping rate over the three-year projected life of the Proposed Action will have a negligible cumulative effect on water quality.

5.4.6 Minerals

Under the proposed Project, only 5.6 acres of land is proposed to be disturbed. As such, there is little potential for any conflict between the Proposed Action and any future locatable mineral claim activity that may be proposed on these same lands during the same period. Neither party (the geothermal lessee nor potential future mineral claimants) may proceed with operations on leased or claimed public lands without notice to the BLM. The potential for any cumulative effects is low.

5.4.7 Migratory Birds

As the Project would have no direct impacts to migratory birds given the nature of the project area and lack of vegetation, the Project would not contribute to any cumulative impacts to migratory birds.

5.4.8 Threatened or Endangered Species

As the Project would have no effect on threatened and endangered species, the Project would not contribute to any cumulative impacts to threatened and endangered species.

5.4.9 Wildlife Resources

As the Project would have no direct impacts to wildlife given the nature of the project area and lack of vegetation, the Project would not contribute to any cumulative impacts to wildlife resources.

5.4.10 Noxious Weeds

As the Project would have no direct impacts related to noxious weeds given that the project area does not currently contain noxious weeds and the likelihood of their establishment is low, the Project would not contribute to any cumulative impacts related to noxious weeds.

5.4.11 Recreation

As the Project would have no effect on recreation, the Project would not contribute to any cumulative impacts to recreational users.

5.4.12 Visual Resources

Potential cumulative visual impacts would result from the well pad construction and well drilling operations of the proposed Project in the context of current and proposed projects within Clayton Valley. The majority of existing projects in the CESA have similar visual effects as compared to the proposed Project. Although the existing town of Silver Peak is within the study area and the existing lithium brine mining comprises a significant footprint of the valley, the overall character of the valley is generally perceived to be natural.

The proposed Project is considered temporary and reclamation and mitigation of the individual well sites are proposed. Despite these measures, the short-term modifications to the CESA by the proposed Project, along with the past, present, and reasonably foreseeable future projects would change the visual character of the valley by introducing modifications to form, line, color, and texture that could provide contrast in the landscape during the life of the Project. When considering the proposed mitigation measures, the existing visual setting, and the VRM Class IV designation and compliance, the proposed Project would not substantially add to the cumulative effects.

5.4.13 Socio-Economic Values

Economic impacts would be expected from the exploration activities. Most of the exploration work force would be specialized workers from outside the area, although some of the mineral exploration construction materials could be purchased from local merchants. Some impacts may be realized from the purchase of meals, entertainment, and other goods and services by construction workers. However, the Proposed Action would not induce substantial growth or concentration of population, displace a large number of people, cause a substantial reduction or increase in employment, reduce or increase wage and salary earnings, cause a substantial net increase in county expenditures, or create a substantial demand for public services. It is expected that the cumulative and incremental socio-economic effects of the Proposed Action would be beneficial and of short duration.

5.4.14 Land Use Authorizations

As the Project would have no effect on land use authorizations, the Project would not contribute to any cumulative impacts to land use authorizations. The valid, existing rights of the federal geothermal leases noted in Section 1.1 would be addressed when granting new approvals within the project area.

5.5 NO ACTION ALTERNATIVE

None of the proposed geothermal drilling Project activities would be undertaken if the No Action Alternative is selected. There would be no cumulative effects from the proposed Project on any of the identified resources or activities from implementation of the No Action Alternative.

5.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Ground water or mineral resources could be damaged if wells leak or if the subsurface flow paths are changed as a result of geothermal exploration. To minimize this potential, geothermal wells would be designed, constructed, and operated in accordance with BLM and State of Nevada requirements. Although unlikely, such incidents could occur, and the resultant damage would be irreversible. Heat extracted from geothermal fluids during well testing would constitute an irreversible and irretrievable commitment of the thermal resource.

6. MITIGATION AND MONITORING

The BLM requires that decisions be implemented in accordance with the appropriate decision document (Decision Record/Finding of No Significant Impact). Monitoring is needed to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the decision. The BLM would fulfill this responsibility by monitoring the implementation of mitigation measures adopted as conditions of approval to the submitted Operations Plan and Geothermal Drilling Permits, as well as the stipulations attached to the geothermal lease.

The following mitigation and monitoring measures were developed through the analysis conducted in this EA.

- The reserve pit shall maintain a minimum two feet of freeboard at all times.

- Initial ground-disturbing activities would not be conducted during the migratory bird nesting season (March 30 through August 15), unless necessary, and only after a qualified biologist first inventories for migratory birds and nests. This survey would be conducted to identify either breeding adult birds or nesting sites within 100 m. of the specific areas to be disturbed. If active nests are present within these areas to be disturbed, Rockwood would coordinate with the BLM or appropriate state officials, as applicable, to develop appropriate protection measures, which may include avoidance, construction constraints, and/or the establishment of buffers.

- Wellhead equipment left on the drill site following the completion of drilling would be painted a color which would blend with the landscape, pursuant to BLM Instructional Memorandum (IM) 2007-021 and the Gold Book (USDI and USDA 2007). Prior to paint selection, Rockwood would contact the Tonopah Field Office Project lead for concurrence.

- Given the importance of maintaining dark sky conditions, conscious efforts would be made to protect the current dark skies from light pollution. All drill rig and facility lights would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner that focuses direct light to the immediate work area.

- To minimize the potential for the spread of noxious and invasive weeds in the project area, all construction vehicles and equipment would be cleaned of all soil and plant material using high-pressure equipment (compressed air or water) prior to arrival at the work site.

- The Project site would be monitored over the life of the Project to determine the presence of any invasive, noxious, and non-native species. Invasive, noxious, and non-native species that have been identified during monitoring would be promptly treated and controlled. A Pesticide Use Proposal (PUP) would be submitted to the BLM Tonopah Field Office for approval prior to the use of herbicides.

7. COORDINATION AND CONSULTATION

7.1 LIST OF PREPARERS

BLM Battle Mountain Renewable Energy Coordination Office (RECO)
Tim Coward, Battle Mountain District, Project Manager
Larry Grey, Battle Mountain District, Hydrologist
William Coyle, Battle Mountain District, GIS Specialist
Wendy Seley, Battle Mountain District, Realty Specialist
Michael Wissenbach, Battle Mountain, Planning and Environmental Coordinator

BLM Tonopah Field Office
Devin Englestead, Wildlife Biologist
Karen Goldsmith, Legal Clerk
John Hartley, Planning and Environmental Coordinator
Marc Pointel, Supervisory Rangeland Management Specialist
Susan Rigby, Cultural Resources Specialist

U.S. Department of Energy, National Energy Technology Laboratory
William J. Gwilliam, Physical Scientist/Project Manager
Mark L. McKoy, Senior Management Regulatory & Technical Advisor

Environmental Management Associates
Heather Altman, Senior Environmental Specialist
Dwight L. Carey, Principal
Erin Wielenga, Environmental Specialist

7.2 AGENCIES, GROUPS, AND INDIVIDUALS CONTACTED

Native American Contacts
Death Valley Timbisha Shoshone Tribe of California

Rockwood Lithium Inc., (formerly Chemetall Foote Corporation)
Arnold Wolf, Senior Project Manager
Mike Stevens, Project Manager

Jacobs
James Miller, Project Manager

Nevada Natural Heritage Program
Eric Misgow, Data Manager

8. REFERENCES

Bureau of Land Management (BLM). 1986. Bureau of Land Management Manual Handbook H-8410-1 Visual Resource Inventory. January 1, 1986.

Bureau of Land Management (BLM). 1997. Tonopah Resource Management Plan and Record of Decision. October 6, 1997.

Bureau of Land Management (BLM). 2008. National Environmental Policy Act. Handbook H-1790-1.

Bureau of Land Management (BLM). 2011a. Geographic Report, System Id-MC. List of Mining Claims by Section. Land and Mineral Records, LR2000. Retrieved on November 22, 2011.

Bureau of Land Management (BLM). 2011b. Geographic Report, System Id-CR. Geographic Report with Customer, Authorized. Land and Mineral Records, LR2000. Retrieved on November 22, 2011.

Bureau of Land Management (BLM). 2011c. Clayton Valley Geothermal Exploration Project. Ram Power, Inc. April 2011.

Bureau of Land Management (BLM), Battle Mountain District Office (BMDO). 2011. Socioeconomic Baseline Assessment Report. Resource Management Plan, Environmental Impact Statement. November 2011.

Department of Energy (DOE), National Energy Technology Laboratory (NETL). 2010. Final Environmental Assessment for Chemetall Foote Corporation Electric Drive Vehicle Battery and Component Manufacturing Initiative Kings Mountain, NC and Silver Peak, NV. EA Number DOE/EA-1715. September 2010.

Chemetall Foote Corporation (Chemetall). 2010. News Release, July 12, 2010. Available at http://www.chemetalllithium.com/en/news/company-news.html.

Eakin, T.E., G.B. Maxey, T.W. Robinson, J.C. Fredericks, and O.J. Loeltz. 1951. Contributions to the hydrology of eastern Nevada: Nevada State Engineer's Office, Water Resources Bulletin no. 12. 171 p.

Environmental Protection Agency (EPA). 2011. Currently Designated Nonattainment Areas for All Criteria Pollutants. Available at http://www.epa.gov/oar/oaqps/greenbk/ancl.html#NEVADA. Accessed November 22, 2011.

Nevada Division of Wildlife (NDOW). 2012. RE: Data Request Silver Peak Geothermal Project. January 25, 2012.

Nevada Natural Heritage Program (NNHP). 2011. RE: Data Request Received 06 June 2011. Signed: Eric S. Miskow. June 10, 2011.

Jennings, M. 2010. Re-analysis of Groundwater Supply Fresh Water Aquifer of Clayton Valley, Nevada.

U.S. Census Bureau. 2011. Tonopah CDP, Nevada, Fact Sheet. Available at http://factfinder2.census.gov. Accessed November 29, 2011.

U.S. Census Bureau. 2012. Silver Peak CDP, Nevada, Fact Sheet. Available at http://factfinder2.census.gov. Accessed August 14, 2012.

U.S. Department of the Interior (USDI) and United States Department of Agriculture (USDA). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

U.S. Fish and Wildlife Service (USFWS). 2011. Species list for the Silver Peak Area Geothermal Exploration Project, Esmeralda County, Nevada. File No. 2011-SL-0303. July 5, 2011.

Appendix A: Reclamation Plan

Reclamation Plan

October 2012

Rockwood Lithium Inc (Rockwood), formerly doing business as Chemetall Foote Corporation, is proposing to construct, operate, and maintain the Silver Peak Area Geothermal Exploration Project (Project) within Esmeralda County, Nevada. Reclamation is required for the two geothermal well pads located on public lands managed by the Bureau of Land Management (BLM).

Reclamation Objectives:

The long-term objective of reclamation is to return the land to a condition approximating to that which existed prior to pre-drill conditions, cleaning the pad and filling the mud pit. It is expected that the geothermal wells would be integrated into a geothermal power project. If the wells are productive, areas adjacent to the wells would remain graveled to allow maintenance access to the wells. If the wells are not productive, the wells would be abandoned in conformance with the well abandonment requirements of the BLM and NDOM.

Reclamation Actions:

Procedure:

- The BLM would be notified 24 hours prior to commencement of any reclamation operations.

Housekeeping:

- Immediately upon well completion, the well location and surrounding areas(s) would be cleared of, and maintained free of, all debris, materials, trash, and equipment not required for production.
- No hazardous substances, trash, or litter would be buried or placed in pits. Upon well completion, any hydrocarbons in the pit would be remediated or removed.

Surface Management:

- Operations would disturb the minimum amount of surface area necessary to conduct safe and efficient operations. As the area proposed for construction is within an existing evaporation pond and devoid of vegetation, no vegetation removal is anticipated.
- The selected drill sites are located within an existing evaporation pond on land that is already heavily disturbed. Surface material, comprised largely from construction of the reserve pits, would be removed and salvaged during construction, as feasible.
- Earthwork for reclamation would be completed within 6 months of final well completion or plugging unless a delay is approved in writing by the BLM Authorized Officer.

Pit Closure:

- Reserve pits would be closed and backfilled within six months of release of the rig.
- All reserve pits remaining open after six months would require written authorization of the Authorized Officer.
- Immediately upon well completion, any hydrocarbons or trash in the pit would be removed. Pits would be allowed to dry, be pumped dry, or solidified in-situ prior to backfilling.

- Following completion activities, when dry, the pit would be backfilled with a minimum of 5 feet of soil material. The pit area would be slightly mounded above the surrounding grade to allow for settling and to promote surface drainage away from the backfilled pit.
- All exclosure fencing around the reserve pits would be removed.

Well Abandonment:

- A well with no commercial potential may continue to be monitored, but will eventually be plugged and abandoned in conformance with the well abandonment requirements of the BLM and NDOM. Abandonment typically involves filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level. The well head (and any other equipment) will then be removed, the casing cut off well below ground surface and the hole backfilled to the surface.

Management of Invasive, Noxious, and Non-Native Species:

- The selected drill sites are located within an existing evaporation pond on land that is already heavily disturbed and covered with saline sediments. Invasive, noxious, and non-native species are currently not present and their growth is not expected.
- Rockwood would perform a noxious weed monitoring program of the project area during the course of the project including the reclamation period to ensure the continued absence of any noxious weed species.
- All reclamation equipment would be cleaned prior to use to reduce the potential for introduction of noxious weeds or other undesirable non-native species.

Visual Resources Mitigation:

- To reduce the view of well head facilities from visibility corridors and private residences, facilities would not be placed in visually exposed locations (such as ridgelines and hilltops).

Final reclamation:

- Final reclamation actions would be completed within 6 months of long-term well testing, weather permitting.
- Final abandonment of temporary pipelines and flowlines would involve flushing and properly disposing of any fluids in the lines. All surface lines and any lines that are buried close to the surface that may become exposed in the foreseeable future due to water or wind erosion, soil movement, or anticipated subsequent use, would be removed.

<u>Reclamation Monitoring and Final Abandonment Approval</u>

- Reclaimed areas would be monitored annually. Actions would be taken to ensure that reclamation standards are met as quickly as reasonably practical and are maintained during the life of the Project.
- Reclamation monitoring would be documented in an annual reclamation report submitted to the authorized officer by [March 1]. The report would document compliance with all aspects of the reclamation objectives, identify whether the reclamation objectives are likely to be achieved in the near future without additional actions, and identify actions that have been or would be taken to meet the objectives. The report would also include acreage figures for: Initial Disturbed Acresand Successful Final Reclaimed Acres.
- Annual reports would not be submitted for sites approved by the Authorized Officer in writing as having met final reclamation standards.

- Monitoring and reporting continues annually until final reclamation is approved. Any time 30% or more of a reclaimed area is re-disturbed, monitoring would be reinitiated.
- The Authorized Officer would be informed when reclamation has been completed, appears to be successful, and the site is ready for final inspection.

Appendix B: Federal Geothermal Lease Stipulations

Form 3200-24a
(September 2008)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial No.
NVN-87008

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES
(For New Leases Issued Under the Energy Policy Act of 2005 [August 5, 2005])

The undersigned (see page 2) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970, as amended (30 U.S.C. 1001-1025).

READ INSTRUCTIONS BEFORE COMPLETING

1. Name	1a. Street	
Chemetall Foote Corp.	PO Box 98	
1b. City	1c. State	1d. Zip Code
Silver Peak	Nevada	89047

2. Surface managing agency if other than BLM: _____ Unit/Project: _____

Legal description of land requested (segregate by public domain and acquired lands): Enter T., R., Meridian, State and County

T 2 S R 39 E Section 23 SW¼NW¼, NW¼SW¼, SE¼NW¼, N½NE¼SW¼ , S½NW¼NE¼, SW¼NE¼, N½NW¼SE¼, NE¼NE¼, SE¼NE¼, N½NE¼SE¼
T 2 S R 39 E Section 24 NW¼NW¼, SW¼NW¼, NW¼SW¼, N½SW¼SW¼, NE¼NW¼, SE¼NW¼, NE¼SW¼, SE¼SW¼, NW¼NE¼, SW¼NE¼, NW¼SE¼, SW¼SE¼
T 2 S R 39 E Section 13 S½SE¼SW¼, S½SW¼SE¼
T 2 S R 39 E Section 25 NE¼ NW¼, NW¼NE¼

RECEIVED
AUG 18 2010
BLM NVSO IAC

Total Acres Applied for 900 acres
Percent U.S. interest 100%

Amount remitted: Processing Fee $ 375.00 Rental Fee $ 900.00 Total $ 1,275.00

DO NOT WRITE BELOW THIS LINE

3. Land included in lease: Enter T., R., Meridian, State and County

SAME AS ITEM 2

Future rental payments must be made on or before the anniversary date to:
Office of Natural Resource Revenue
Royalty Management Program
P.O. Box 5640
Denver, CO 80217

Total Acres in Lease 900.000
Rental Retained $ 900.00

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years and subsequent extensions thereof in accordance with 43 CFR subpart 3207. Rights granted are subject to: applicable laws; the terms, conditions, and attached stipulations of this lease; the Secretary of the Interior's regulations and formal orders in effect as of lease issuance; and, when not inconsistent with the provisions of this lease, regulations and formal orders hereafter promulgated.

Type of Lease:
- ☐ Competitive
- ☑ Noncompetitive
- ☐ Noncompetitive direct use (43 CFR subpart 3205)

Comments:

THE UNITED STATES OF AMERICA

BY _____
(Signing Official)

(Printed Name)
Chief, Branch of Minerals Adjudication
(Title)

OCT 27 2010
(Date)

EFFECTIVE DATE OF LEASE NOV 01 2010

Check if this is a converted lease ☐

EFFECTIVE DATE OF LEASE CONVERSION _____

(Continued on page 2)

4. (a) The undersigned certifies that:
(1) The offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR part 3200 and the authorizing Act; (3) The offeror's chargeable interests, direct and indirect, do not exceed those allowed under the Act; and (4) The offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) The undersigned agrees that signing this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which the offeror has been given notice. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations or if it is not accompanied by the required payments. Title 18 U.S.C. § 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this 16 day of August 2010 Joseph L. Dunn General Manager
(Printed Name of Lessee or Attorney-in-fact)

(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals must be paid to the proper office of the lessor in advance of each lease year. Annual rental rates per acre or fraction thereof, as applicable, are:
(a) Noncompetitive lease (includes post-sale parcels not receiving bids, a direct use lease or a lease issued to a mining claimant): $1.00 for the first 10 years; thereafter $5.00; or
(b) Competitive lease: $2.00 for the first year; $3.00 for the second through tenth year; thereafter $5.00.
Annual rental is always due by the anniversary date of this lease (43 CFR 3211.13), regardless of whether the lease is in a unit or outside of a unit, the lease is in production or not, or royalties or direct use fees apply to the production.
Rental may only be credited toward royalty under 43 CFR 3211.15 and 30 CFR 218.303. Rental may not be credited against direct use fees. Failure to pay annual rental timely will result in late fees and will make the lease subject to termination in accordance with 43 CFR 3213.14.

Sec. 2. (a) Royalties—Royalties must be paid to the proper office of the lessor. Royalties are due on the last day of the month following the month of production. Royalties will be computed in accordance with applicable regulations and orders. Royalty rates for geothermal resources produced for the commercial generation of electricity but not sold in an arm's length transaction are: 1.75 percent for the first 10 years of production and 3.5 percent after the first 10 years. The royalty rate is to be applied to the gross proceeds derived from the sale of electricity in accordance with 30 CFR part 206 subpart H.
The royalty rate for byproducts derived from geothermal resource production that are minerals specified in section 1 of the Mineral Leasing Act (MLA), as amended (30 U.S.C. 181), is 5 percent, except for sodium compounds, produced between September 29, 2006 and September 29, 2011 (Pub. L. No. 109-338, §102; note to 30 U.S.C. 362) for which the royalty rate is 2 percent. No royalty is due on byproducts that are not specified in 30 U.S.C. § 181. (43 CFR 3211.19.)
If this lease or a portion thereof is committed to an approved communitization or unit agreement and the agreement contains a provision for allocation of production, royalties must be paid on the production allocated to this lease.
(b) Arm's length transactions—The royalty rate for geothermal resources sold by you or your affiliate at arm's length to a purchaser is 10 percent of the gross proceeds derived from the arm's-length sale (43 CFR 3211.17, 3211.18).
(c) Advanced royalties—In the absence of a suspension, if you cease production for more than one calendar month on a lease that is subject to royalties and that has achieved commercial production, your lease will remain in effect only if you make advanced royalty payments in accordance with 43 CFR 3212.15(a) and 30 CFR 218.305.
(d) Direct use fees—Direct use fees must be paid in lieu of royalties for geothermal resources that are utilized for commercial, residential, agricultural, or other energy needs other than the commercial production or generation of electricity, but not sold in an arm's length transaction (43 CFR 3211.18; 30 CFR 206.356).
This requirement applies to any direct use of federal geothermal resources (unless the resource is exempted as described in 30 CFR 202.351(b) or the lessee is covered by paragraph (e), below) and is not limited to direct use leases. Direct use fees are due on the last day of the month following the month of production.
(e) If the lessee is a State, tribal, or local government covered by 43 CFR 3211.18(a)(3) and 30 CFR 206.366, check here: ☐. A lessee under this paragraph is not subject to paragraph (d), above. In lieu of royalties, the lessee under this paragraph must pay a nominal fee of
$ _____

Sec. 3. Bonds—A bond must be filed and maintained for lease operations as required by applicable regulations.

Sec. 4. Work requirements, rate of development, unitization, and drainage--Lessee must perform work requirements in accordance with applicable regulations (43 CFR 3207.11, 3207.12), and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves the right to specify rates of development and production and to require lessee to commit to a communitization or unit agreement, within 30 days of notice, if in the public interest. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in the amount determined by lessor. Lessor will exempt lessee from work requirements only where the lease overlies a mining claim that has an approved plan of operations and where BLM determines that the development of the geothermal resource on the lease would interfere with the mining operation (43 CFR 3207.13).

Sec. 5. Documents, evidence, and inspection—Lessee must file with the proper office of the lessor, not later than (30) days after the effective date thereof, any contract or evidence of other arrangement for the sale, use, or disposal of geothermal resources, byproducts produced, or for the sale of electricity generated using geothermal resources produced from the lease. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements and all documents showing (a) amounts and quality of all geothermal resources produced and used (either for commercial production or generation of electricity, or in a direct use operation) or sold; (b) proceeds derived therefrom or from the sale of electricity generated using such resources; (c) amounts that are unavoidably lost or reinjected before use, used to generate plant parasitic electricity (as defined in 30 CFR 206.351) or electricity for lease operations, or otherwise used for lease operations related to the commercial production or generation of electricity; and (d) amounts and quality of all byproducts produced and proceeds derived from the sale or disposition thereof. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest.
In a format and manner approved by lessor, lessee must: keep a daily drilling record, a log, and complete information on well surveys and tests; keep a record of subsurface investigations; and furnish copies to lessor when required.

Lessee must keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, billing records, invoices, gross proceeds and payment data regarding the sale, disposition, or use of geothermal resources, byproducts produced, and the sale of electricity generated using resources produced from the lease, and all other information relevant to determining royalties or direct use fees. All such records must be maintained in lessee's accounting offices for future audit by lessor and produced upon request by lessor or lessor's authorized representative or agent. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

Sec. 6. Conduct of operations—Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses will be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee. Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessor may require lessee to complete minor inventories or short term special studies under guidelines provided by lessor. If, in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that are likely to affect or take such species, or result in the modification, damage or destruction of such habitats or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee must maintain a safe working environment in accordance with applicable regulations and standard industry practices, and take measures necessary to protect public health and safety. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor may maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Subject to the requirements of 43 CFR subpart 3213, lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date BLM receives it, subject to the continued obligation of the lessee and surety to be responsible for: paying all accrued rentals and royalties; plugging and abandoning all wells on the relinquished land; restoring and reclaiming the surface and other resources; and complying with 43 CFR 3200.4.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee must place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease or other applicable requirements under 43 CFR 3200.4, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to termination in accordance with the Act and 43 CFR 3213. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy or action, including waiver of the default. Any such remedy, waiver, or action will not prevent later termination for the same default occurring at any other time. Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or other applicable requirements under 43 CFR 3200.4, and immediate action is required, the lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the lessee's expense.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

RECEIVED
AUG 18 2010

(Continued on page 3)

Attachment A
Stipulations

Compatibility with urban interface

This stipulation would be applied to minimize the potential for adverse impact to residential areas, schools, or other adjacent urban land uses.

Disposal Areas for community expansion listed in the Resources Management Plan (RMP) pursuant to the Federal Land Policy and Management Act of 1976 (FLMPA) sec. 203 (Sales).

Chemetall Foote Parcel

Description of Lands
T. 2 S., R. 39 E., MDM, Nevada
sec. 23, SWNW, NWSW, SENW, N2NESW, S2NWNE, SWNE, N2NWSE, NENE, SENE, N2NESE;
sec. 24, W2NW, NWSW, N2SWSW.

Joseph L. Dunn

Chemetall Foote Corp.
Name: Joseph L. Dunn
Title: General Manager

10/4/2010
Date

Appendix C: Comments Received and Responses to Comments

STATE OF NEVADA
DEPARTMENT OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
(775) 688-1500 • Fax (775) 688-1207

BRIAN SANDOVAL
Governor

KENNETH E. MAYER
Director

RICHARD L. HASKINS II
Deputy Director

SOUTHERN REGION OFFICE
4747 Vegas Drive
Las Vegas, Nevada 89108
(702) 486-5127 · Fax (702) 486-5133

October 29, 2012

NDOW-SR # 13-081
LVO-13-014
SAI#: E2013-080

Mr. Tim Coward
BLM Tonopah Field Office
Rockwood Silver Peak Geothermal EA
1553 S. Main Street, P.O. Box 911
Tonopah, NV 89049

Re: Environmental Assessment for the Silver Peak Area Geothermal Exploration Project (EA)

Dear Mr. Coward:

The Nevada Department of Wildlife (Department) thanks you for the opportunity to provide comments. As you know, large numbers of waterfowl and shorebirds are attracted to Rockwood's existing solar evaporation ponds. This nearby situation potentially increases the likelihood of migratory birds coming into contact with any reserve pit fluids produced as by-products of geothermal exploration drilling. Should reserve pits contain oil, condensates, or other hydrocarbons or hydraulic fracturing fluids, the risk of bird mortality becomes very high (Ramirez 2009). For example, hydraulic fracturing fluids may contain chemicals (*e.g.*, surfactants, hydrochloric acid, caustic potash, and diesel fuel) further increasing potential harm to birds. Other additives typically used in drilling fluids, like partially hydrolyzed polyacrylamide (PHPA) used to increase viscosity of fluid, can cause wildlife entrapment. Comments more specific to sections of the EA are detailed below.

Section 2.1.3.1 Short Term Well Testing (pg.11)
We understand fluid produced during short-term testing would be piped (via the temporary pipeline) primarily to Pond 17W for evaporation and/or stored in a 500 bbl Baker Tank and/or piped to the reserve pit. An *injectivity* test may also be conducted by injecting the produced geothermal fluid from the reserve pit back into the well and the geothermal reservoir.

A-1
- The Department prefers that drilling fluids produced are stored in the closed Baker Tank.
- Pitless drilling or closed-loop drilling methods are also encouraged thereby reducing the amount of drilling waste, facilitates recycling of drilling fluids, and reducing drilling costs (Rogers *et al* 2006a and b). Pitless drilling can reduce the volume of waste by 60 to 70 percent (Rogers *et al* 2006b). Pitless drilling also conserves water and prevents soil contamination. Though, attention is still needed with closed-loop systems to prevent ponding of water in the solids disposal trenches.

A-2
- Should fluids be routed to Rockwood's existing Pond 17W, we recommend wildlife monitoring be conducted, and as necessary, hazing and/or rescue of wildlife until fluids have evaporated.

A-2

Section 2.1.8.3 Wildlife Protection (pg. 15)
The Department understands Rockwood would monitor the reserve pits while they contain fluids and report wildlife hazing and mortality events to the Department. Please see comments immediately above requesting the same monitoring and reporting for 17W Pond.

Appendix A: Reclamation Plan (pg.44)
Human activities and noise associated with drilling operations would probably discourage use of reserve pits by birds like waterfowl. However, once the drilling rig and other equipment are removed from the well pads, reserve pits become attractive to birds and other wildlife (Ramirez 2009). Ramirez also reported that the longer the reserve pit is left on site, the greater the probability that aquatic birds will land on the pit.

A-3

- Therefore, immediate removal of drilling fluids after well completion is the key to preventing wildlife mortality at reserve pits.
- If immediate removal is not possible, then the Department recommends monitoring and closure of reserve pits within 30 days of release of the drilling rig as opposed to the six month time frame noted in the Reclamation Plan.

Thank you again for this input opportunity. For additional assistance, please contact Habitat Biologist Tracy Kipke at the Department's Southern Region Office in Las Vegas. She can be reached at 702-486-5127 x3612 or by email at tkipke@ndow.org.

Sincerely,

D. Bradford Hardenbrook
Supervising Habitat Biologist

TK:tk

cc: NDOW, Files
USFWS, Las Vegas

References Cited

Ramirez, P. Jr. 2009. Reserve Pit Management: Risks to Migratory Birds. Online: http://www.fws.gov/mountain-prairie/contaminants/documents/ReservePits.pdf.

Rogers D., G. Fout and W. A. Piper. 2006a. New innovative process allows drilling without pits in New Mexico. The 13th International Petroleum Environmental Conference, San Antonio, Texas, Oct. 17 – 20, 2006.

Rogers, D.; D. Smith; G. Fout; and W. Marchbanks. 2006b. Closed-loop drilling system: A viable alternative to reserve waste pits. World Oil Magazine 227(12): Online: http://www.worldoil.com/magazine/MAGAZINE_DETAIL.asp?ART_ID=3053&MONTH_YEAR=Dec-2006.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

OCT 29 2012

Mr. Tim Coward
Bureau of Land Management
Rockwood Silver Peak Environmental Assessment
1553 South Main Street
Tonopah, Nevada 89049

Subject: Silver Peak Area Geothermal Exploration Project Draft Environmental Assessment, Esmeralda County, Nevada

Dear Mr. Coward:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Assessment for the proposed Silver Peak Area Geothermal Exploration Project. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508).

The EPA is pleased with the intended use of previously disturbed lands for this project. We have two concerns, however, with two components of the analysis: estimates of air emissions and cumulative impacts. The DEA states that air emissions from the proposed project would be primarily attributable to construction equipment, well drilling (diesel exhaust and fugitive dust) and well testing (hydrogen sulfide and greenhouse gas emissions). It also states that the proposed project is not expected to contribute to any violation of federal or Nevada ambient air quality standards, and no residual air quality impacts are expected because there would be no further fugitive dust or combustion emissions once activities ceased (p. 25). Although the DES qualitatively describes the ambient air quality, it does not estimate air emissions from and during the anticipated activities.

B-1 Based on the information provided in the DEA, it appears that sufficient detail regarding the project is available that an emissions estimate could be prepared. The EPA recommends that you quantify the emissions of criteria pollutants and volatile organic compounds based on the amount of construction activity, drill rig operations and well testing to be performed. This should then be compared to the existing NAAQS threshold levels. While the area proposed for development is currently in attainment for all NAAQS, an emissions estimate would provide a quantitative assessment of the potential air impacts of this project, and would be useful for a cumulative impacts analysis for the other projects in the area.

B-2 The DOE completed an EA for the expansion of the lithium mining operations at Silver Peak in 2011. The expansion project will involve drilling additional wells and expanding the evaporation ponds. Industry news reports that the expansion project has started. It is unclear from the EA if this action has been completed. If it has not been completed, the EPA recommends that the impacts of the drilling,

B-2 evaporation pond construction, increased workforce and increased groundwater use be included in the cumulative impacts analysis for the proposed geothermal project.

We appreciate the opportunity to review this Draft EA and are available to discuss our comments. When the Final EA is released for public review, please send one hard copy and one electronic copy to the address above (mail code: CED-2). If you have any questions, please contact Scott Sysum, the lead reviewer for this project, at (415) 972-3742 or sysum.scott@epa.gov. You may also contact me at (415) 972-3521.

Sincerely,

FOR

Kathleen Martyn Goforth
Manager
Environmental Review Office (CED-2)
Communities and Ecosystems Division

Wissenbach, Michael J

From: Skip Canfield <scanfield@lands.nv.gov>
Sent: Monday, October 29, 2012 2:29 PM
To: Wissenbach, Michael J; Coward, Timothy J
Cc: scanfield@lands.nv.gov
Subject: State Agency Comments E2013-080 - EA - Silver Peak Geothermal Exploration
Attachments: E2013-080SR13-081SilverPeakGeothermalEA29Oct12.pdf.pdf

The Nevada State Clearinghouse received the attached comments and the comments below regarding this proposal, http://clearinghouse.nv.gov/public/Notice/2013/E2013-080.pdf

Skip Canfield
Nevada State Clearinghouse
State Land Use Planning Agency

Nevada Division of State Lands
Department of Conservation and Natural Resources
901 South Stewart Street, Suite 5003
Carson City, NV 89701
775-684-2723
http://clearinghouse.nv.gov
www.lands.nv.gov

The Nevada Division of State Lands and the State Land Use Planning Agency offer the following comments:

Please consider the cumulative visual impacts from development activities (temporary and permanent). Some notable activities include proliferation of new roads, poorly-sited and designed structures, lack of co-location of infrastructure and improper lighting, to name a few.

The following mitigation measures are suggested:

Utilize appropriate lighting:

- Utilize consistent lighting mitigation measures that follow "Dark Sky" lighting practices.
- Effective lighting should have screens that do not allow the bulb to shine up or out. All proposed lighting shall be located to avoid light pollution onto any adjacent lands as viewed from a distance. All lighting fixtures shall be hooded and shielded, face downward, located within soffits and directed on to the pertinent site only, and away from adjacent parcels or areas.

C-1

- A lighting plan should be submitted indicating the types of lighting and fixtures, the locations of fixtures, lumens of lighting, and the areas illuminated by the lighting plan.
- Any required FAA lighting should be consolidated and minimized wherever possible.

In addition, the following mitigation measures should be employed.

Utilize building materials, colors and site placement that are compatible with the natural environment:

- Utilize consistent mitigation measures that address logical placement of improvements and use of appropriate screening and structure colors. Existing utility corridors, roads and areas of disturbed land should be utilized wherever possible. Proliferation of new roads should be avoided.

C-2

- For example, the use of compatible paint colors on structures reduces the visual impacts of the built environment. Using screening, careful site placement, and cognitive use of earth-tone colors/materials that match the environment improve the user experience for others who might have different values than what is fostered by built environment activities.

- Federal agencies should require these mitigation measures as conditions of approval for all permanent and temporary applications.

Skip Canfield
State Land Use Planning Agency

Wissenbach, Michael J

From: Coward, Timothy J
Sent: Monday, October 29, 2012 6:20 PM
To: Coyle, William H; Wissenbach, Michael J
Cc: Seley, Thomas J
Subject: Fw: Rockwood Geothermal EA

Importance: High

From: Paul Rupp [mailto:silverpeakitis@msn.com]
Sent: Monday, October 29, 2012 06:54 PM
To: Coward, Timothy J
Subject: Rockwood Geothermal EA

NOTICE - OBJECTION

October 29, 2012

VIA USPS Certified Mail # 7007 0710 0001 5249 0331
VIA FAX to: 775.482.7810, E-MAIL to: tcoward@blm.gov

Mr. Tim Coward
Bureau of Land Management
Tonopah Field Office
P.O. Box 911(1553 South Main Street)
Tonopah, Nevada 89049

Re: Public Comments - Rockwood Geothermal Facility - BLM EA, Silver Peak, NV
N-87008, DOI-BLM-NV-B020-2012-0214-EA
Jennings, M. 2010, "Re-analysis of Groundwater Supply Fresh Water Aquifer of Clayton Valley, Nevada' is Missing from the Packet Received- NO Satellite Data contained in this or any EA concerning Silver Peak-Clayton Valley, barrier faults pertaining to Saline-fresh water Intrusions
Drill water constitutes almost 2 years of Silver Peaks known potable water source D-1

Mr. Coward:

Objection is made: A key technical report titled, " Jennings, M. 2010. Re-analysis of Groundwater Supply Fresh Water Aquifer of Clayton Valley, Nevada" is referenced in subject EA, but was NOT delivered to me or to the Silver Peak Library for review by residents, parcel owners and businesses. D-2

Thus, BLM failed to issue its EA without providing a copy of all relevant reports, i.e., the referenced satellite imagery, etc., nor does the EA address as how to obtain complete copy of the referenced "Jennings" report such that the people living in or near the town of Silver Peak that are most effected by the Project's **FRESH WATER ISSUES and the fact that the town's Municipal**

Water System may or may not be ABLE to deliver Potable Water to residents and businesses for drinking, bathing, cooking, gardening, etc., for the NEXT 100 years, such that people in Silver Peak will be ABLE to review, study, analyze, and prepare a cogent, timely, written response within the absurdly narrow 15 Day Public Comment period, all of which is contrary to the NEPA process.

Therefore, upon availability and thus the ability to deliver the "Jennings" report and any other related reports, BLM must then issue a new NOTICE, set a new DUE DATE allowing a minimum of 30 days to prepare and file written Public Comments, and deliver the updated EA to interested parties.

This being said, there are additional errors and omissions regarding subject EA.

1. Quantification of the **volume of water** produced by the Geothermal Wells, what is done with the water upon exit from the power generation turbines, etc. D-3

2. Quantification of the **Water Quantity** in terms of it being Potable, and thus, whether subject water MAY lawfully be injected into, essentially, the freshwater aquifer. D-4

3. Quantification regarding the **generating capacity and distribution elements** of the geothermal project power generation have not been addressed and are completely MISSING in the EA. D-5

4. A key element of every environmental process is the "**Scoping Hearing**,." And though I have been on the "mailing list" for years, I have NOT received Notice of subject hearing, which requires the EA process be restarted and commenced anew. D-6

5. The satellite images, reports and analysis of the hydrology and geology regarding "Barrier Faults" are MISSING which is a Fatal Flaw because the 2008 report produced by the Esmeralda County Commission- Environmental Information Document Silver Peak Well Replacement Silver Peak Water Utility
Prepared By:
Nancy J. Boland, Esmeralda County Nevada
POB 146
Silverpeak, NV 89047
Phone: (775)-937-2291
Email: escomm2@citlink.net
Prepared For:
U.S. Environmental Protection Agency D-7
Region 9
75 Hawthorne Street
San Francisco, CA 94105
Environmental – FINAL
Project
Esmeralda County Nevada
August 2008, discusses that there may be only a few years before the Fresh Water Aquifer is DEPLETED, AND that as of 2008, saline waters have encroached into the Fresh Water Aquifer resulting in UNKNOWN levels and classes of pollution into Silver Peak's Municipal Water System.
NO Satellite pictures of Barrier Faults are shown in any Chemetall/Rockwood EA's regarding FRESH Water in Clayton Valley?

6. Observations over the past few years would indicate that "Test Drilling" has been **underway BEFORE the subject EA was completed and released.** D-8

7. Section 3.3.3. Native American Religious Concerns of subject EA states that "**Information sharing [has been] on-going with the Death Valley Timbisha Shoshone Tribe of California," and that BLM delivered "a letter describing the Project and offering the opportunity for consultation . . . was sent to the Timbisha Shoshone Tribe** " by BLM "**via certified mail . . . on August 10, 2011,**"" explaining, "**consultation . . .will continue throughout the life of the Project . . ." Then "on January 3, 2012 [BLM] placed a phone call to the Tribe, Chairman George Gholson stated that the letter had been received, and that he had no comment or questions at this time,**" and [BLM] stating that "**the Timbisha Shoshone Tribal representatives will be kept updated on all projects in the Clayton Valley area.**"

It is our position that it is unconscionable that DOI/BLM granted the Death Valley Timbisha Shoshone Tribe of California, who live 100 miles distant from Silver Peak, a unique privilege that unilaterally excluded ALL of the residents of Silver Peak that includes people of a broad range of race, religion and culture, wherein ONLY the Timbisha Shoshone Tribe received the "advanced notice" and offer of the "opportunity to comment before October 11, 2012," giving them alone ten (10) MONTHS to learn the details of the project and prepare and deliver any Public Comments at their leisure, which is not only prejudicial, but shows a complete and utter disrespect towards ALL the People of Silver Peak where noise, water, pollution, health concerns, traffic impacts, etc., are very real have been ALLOWED only two (2) WEEKS to study the Project and prepare and timely file Public Comments. D-9

Moreover, under NEPA, there is the "Socio-Economic" element that must be address in ALL Environmental Studies, but this Element is ABSENT from the EA and the NEPA process has apparently deteriorated to where ONLY the interests of County Officials, Rockwood Corporation, birds, plants, insects, reptiles and Native American Indians' are being considered throughout Clayton Valley where issues of WATER, noise, pollution, health concerns and traffic impacts regarding both the short term of construction and the long term of burgeoning Economic Development are very real but continue to be completely ignored as though the human inhabitants' living in and near Silver Peak have been present for more that 152 YEARS. D-10

other issues NOT ADDRESSED (below)

Chemetall Expansion, Water Availability, Water Potability
The West Edge of the Playa is EAST of the Silver Peak Play Ground and Paul Rupp's Parcels, THUS contrary to assertions the company may NOT dump "spills" from production areas on either the Play Ground or Paul Rupps' parcels D-11

The GeoThermal Power Generation Plant EA is both Inadequate and premature
Building the Chemetall Plant Expansion should not be started until the GeoThermal Plant is proven to be doable, which will require at least THREE YEARS from today to complete the Test Well Drilling and the Temperature, Flow Levels and number of production wells REQUIRED, and if they will Fit within the land alloted by BLM D-12

Silver Peak's Municipal Water System has been known to be NOT POTABLE since 2008 because of infiltration of Saline Waters from the Playa .

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks
Each Federal agency:
(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
(b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. D-13

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

Thank you for your consideration in these important matters.

Sincerely,

Paul Rupp
P.O Box 125
Silver Peak NV 89047
@silverpeakitis@msn.com

Dehnert Queen
10500 Christenson Road
Lucerne Valley, CA 92356
dehnertqueen@desertamerican.com

Co-Founders of the Silver Peak Ad Hoc Advisory Committee

cc: william.gwilliam@netl.doe.gov
Rockwood Lithium

clearinghouse@state.nv.us
Tim Coward, Tonopah BLM @ tcoward@blm.gov
LaCinda Elgan Esmeralda County Clerk @ celgan@citlink.net
Robert Glennen Esmeralda County District Attorney @ escodaoffice@gmail.com
Sandra Johnson Esmeralda Commissioners Assistant @ sjesmcoaa@gmail.com

Letter E

Chemetall Expansion, Water Availability, Water Potability

The West Edge of the Playa is EAST of the Silver Peak Play Ground and Paul Rupp's Parcels, THUS contrary to assertions the company may NOT dump "spills" from production areas on either the Play Ground or Paul Rupps' parcels

The GeoThermal Power Generation Plant EA is both Inadequate and premature

Building the Chemetall Plant Expansion should not be started until the GeoThermal Plant is proven to be doable, which will require at least THREE YEARS from today to complete the Test Well Drilling and the Temperature, Flow Levels and number of production wells REQUIRED, and if they will Fit within the land alloted by BLM

Silver Peak's Municipal Water System has been known to be NOT POTABLE since 2008 because of infiltration of Saline Waters from the Playa.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

Each Federal agency:
(a) shall make it a high priority to identify and assess environmental health risks and safety risks that r disproportionately affect children; and
(b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

CPO - County or Private Ownership Areas

1 Blair Junction
2 Bonnie Claire
3 Coaldale
4 Columbus Salt Marsh
5 Esmeralda Energy Park
6 General Thomas Hills Industrial Park
7 General Thomas Hills North
8 Gold Point North Extention
9 Gold Point Disposal Area
10 Goldfield Disposal Area
11 Goldfield's Airport Industrial Park
12 Goldfield South Extension
13 Lida East Extension
14 Lida Junction
15 Miller' Extention
16 Miller's Disposal Area
17 Mt. Jackson
18 Silver Peak North Extention
19 Silver Peak Disposal Area
20 Tonopah Extention
21 Tonopah Disposal Area
22 Oasis Divide Wind Energy Site

ND - Non-Disposal Areas

1 Clayton Valley Sand Dunes
2 Clayton Valley Petroglyphs
3 Fish Lake Valley Disposal Area with Exceptions
4 Lida Disposal Area
5 Lida West Extention
6 Lida South Extention

RPP - Recreation and Public Purpose Areas

1 Bonnie Claire Airport and Recreation Area
2 Fish Lake Valley Airport
3 Fish Lake Valley Hot Springs and Wildlife Refuge
4 Fish Lake Valley Recreational Park
5 Gold Point Airport
6 Gold Point Cannon and Rifle Range
7 Goldfield Lake and Recreation Park
8 Goldfield Sewage Ponds
9 Lida Junction Airport
10 Silver Lake
11 Star Gazing Park
12 Montezuma Peak Observatories

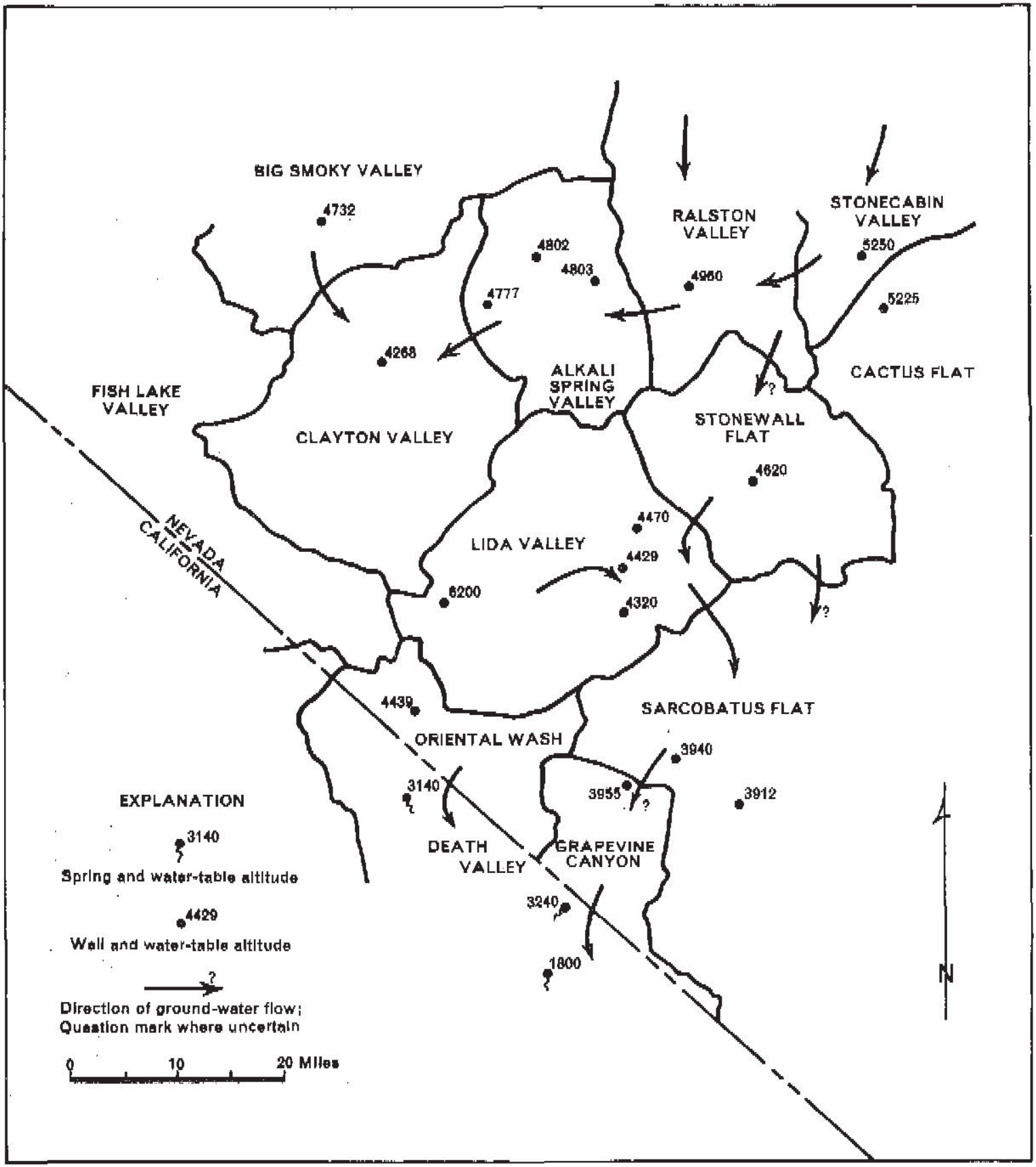
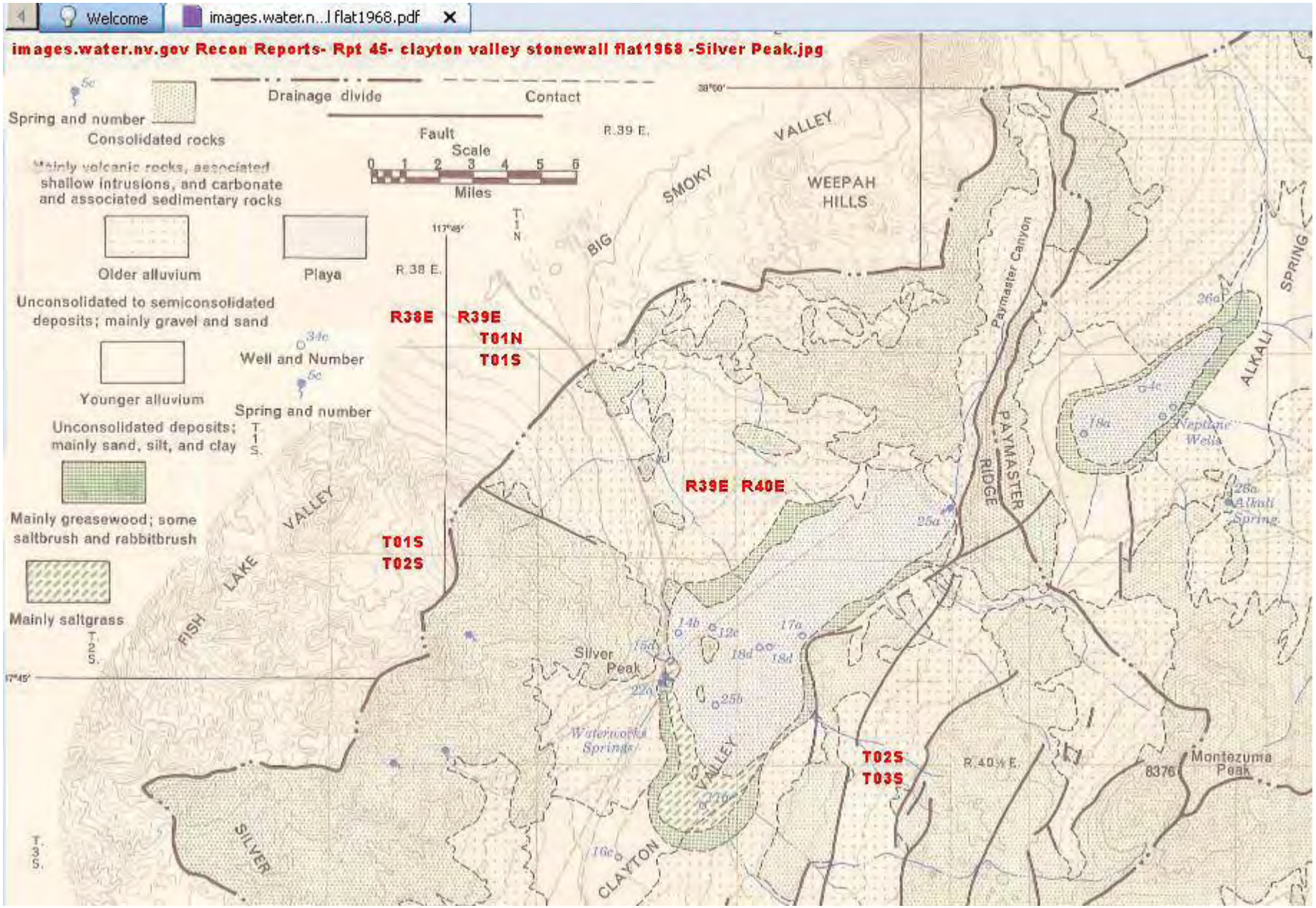
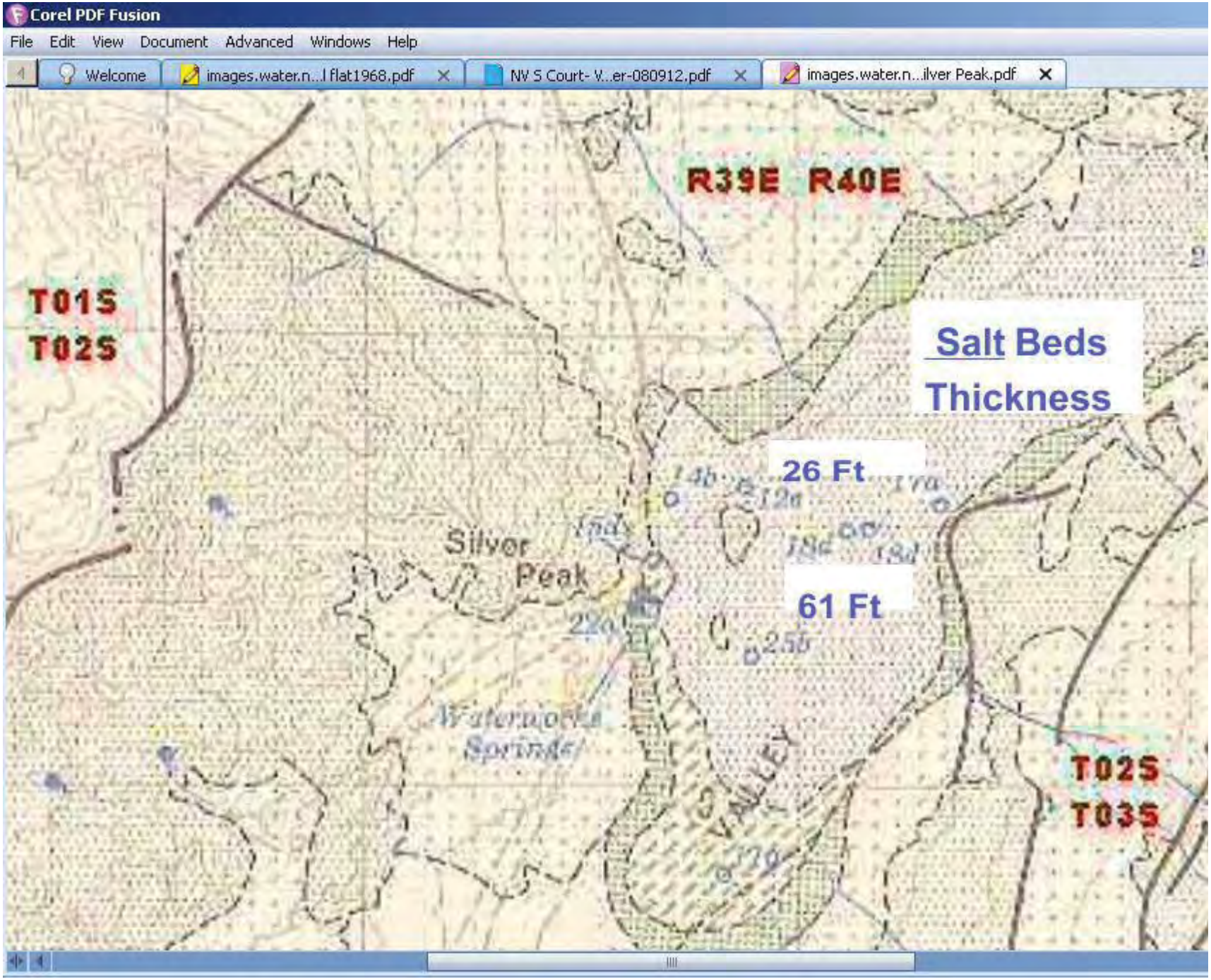


Figure 3.—Generalized map of intervalley ground-water flow as interpreted from water-level data

images.water.nv.gov Recon Reports- Rpt 45- [skip] stonewall flat1968- MAP Groundwater Flow.jpg


Pauls place-1.jpg - Windows Picture and Fax Viewer
Silver Peak
Pauls


Welcome
images.water.n...l flat1968.pdf
images.water.nv.gov Recon Reports- Rpt 45- clayton valley stonewall flat1968 -Silver Peak.jpg
Spring and number
Drainage divide
Contact
Consolidated rocks
Fault
Scale
0 1 2 3 4 5 6
Miles
Mainly volcanic rocks, associated shallow intrusions, and carbonate and associated sedimentary rocks
Older alluvium
Playa
Unconsolidated to semiconsolidated deposits; mainly gravel and sand
Well and Number
Younger alluvium
Spring and number
Unconsolidated deposits; mainly sand, silt, and clay
Mainly greasewood; some saltbrush and rabbitbrush
Mainly saltgrass
R.39 E.
R.38 E.
R38E
R39E
R40E
T01N
T01S
T02S
T03S
T1N
T1S
T2S
T3S
VALLEY
SMOKY
WEEPAH HILLS
BIG
Paymaster Canyon
PAYMASTER RIDGE
ALKALI SPRING
Neptune Wells
Alkali Spring
FISH LAKE VALLEY
Silver Peak
Waterworks Springs
CLAYTON VALLEY
SILVER
Montezuma Peak
8376
R.40½ E.


Corel PDF Fusion
File Edit View Document Advanced Windows Help
Welcome
images.water.n...l flat1968.pdf
NV S Court- V...er-080912.pdf
images.water.n...ilver Peak.pdf
R39E R40E
T01S
T02S
Salt Beds
Thickness
26 Ft
61 Ft
Silver
Peak
Waterworks
Springs
VALLEY
T02S
T03S

Esmeralda County Well Map by Town-Range-Sec for County Municipal & Chemetall Foot Wells ONLY

Total Wells > 81 | Oldest Well 06/19/64 | Newest Well 09/25/09

T-S01-**R-39** < Township & Range

	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia
Sec # >	6			5			4			3			2			1		
Sec # >	7			8			9			10			11			12		
										100	0	8				500	8	12.62
Sec # >	18			17			16			15			14			13		
	700	4	10.62							50	14	6	125	18	6			
	500	4	10.62										741	40	12.75			
													630	40	12.75			
Sec # >	19			20			21			22			23			24		
						Monitoring Well	119	74	4.5	55	10	6				540	160	12.75
Sec # >	30			29			28			27			26			25		
				Public Supply (Municipal) >			400	280	10.75							400	2	6
				Public Supply (Municipal) >			300	167	8									
				Public Supply (Municipal) >			382	169	12									
						Industrial >	300	150	12									
						Monitoring Well	458	165	3									
				Public Supply (Municipal) >			400	237	8.63									
				Public Supply (Municipal) >			400	280	8									
Sec # >	31			32			33			34			35			36		

Red Box Static < 50 Ft

Purple Box Static > 50 Ft

T-S01-**R-40** < Township & Range

	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia	Well Depth	Static Level	Case Dia
Sec # >	6			5			4			3			2			1		
	590	0	12				507	95	12	420	0	12						
					Industrial >		511	65	12									
							870	163	12.75									
Sec # >	7			8			9			10			11			12		
Industrial >	511	38	12	511	11	0	600	0	12									
Industrial >	610	115	0	710	185	12.75	1600	156	16									
	502	38	12	500	118	12	600	0	12									
				505	14	12	600	0	12.75									
				458	46	12	560	0	12									
Public Supply (Municipal) >				1583	185	12	515	8	12.75									
		Industrial >		620	26	12	564	0	12									
						Industrial >	Missimg	10	12									
						Industrial >	595	31	12									
Sec # >	18			17			16			15			14			13		
Industrial >	540	8	12.75	450	15	12	518	185	12.75				500	8	12.75			
	459	80	12	400	8	12.75	585	180	12.75									
	500	180	8	535	90	12.75	1623	156	14.5									
	510	100	12	511	45	12												
	670	0	12	505	67	12												
	458	103	12	540	8	12.75												
	630	80	12.75	592	5	10.75												

Public Supply (Municipal)

	511	85	12	511	38	12													
	511	85	12	511	46	12													
	610	185	12.75	500	8	12.75													
			Industrial >	510	18	12													
				630	20	12.75													
				600	52	12.75													
Sec # >	19			20			21			22			23			24			
	355	8	12.62	571	57	12													
				630	0	12.75													
			Industrial >	510	137	12													
			Industrial >	511	11	12													
				554	0	12.75													
Sec # >	30			29			28			27			26			25			
				273	3	10.75													
Sec # >	31			32			33			34			35			36			

NOTICE INFORMATION REQUEST

May 19, 2011

Sent Via Fax: @ 775 482-7810 and U.S. Cert. Mail# 7002 2410 0001 8066 6106

BLM
Field Manager: Tom Seley
1553 South Main Street
P.O. Box 911
Tonopah Nevada 89049

RE: Chemetall Geothermal Project
BLM/Chemetall/DOE EA 1715???
BLM EA reference number
Drilling Permits
Drilling Location(s)
Overall Progress of proposed geothermal project
Location(s) Proposed Geothermal Electric Generating Facilities
Environmental Impact Study/Environmental Impact Review

Information is requested regarding BLM/Chemetall Foote Corp. Silver Peak, Nevada, proposed geothermal project, including,

1. What is BLM Environmental Assessment (EA) assigned reference number?
2. Has BLM released any information on Chemetall Foote-Geothermal EA?
3. When, how and where will information for BLM/Chemetall geothermal EA be posted and made available for public comment?
4. Have any Permits been issued for Chemetall to drill for geothermal?
5. How many drilling locations for Chemetall Geothermal project?
6. Location(s) of proposed drilling site(s)?
7. Progress report as to when drilling will commence with/without permits?
8. Location(s) of Proposed Geothermal Electric Generating facilities?
9. Full EIS/EIR Required
10. Timely Notice to local community's impacted by proposed Major Project

Review of the 2 DOE/EA Environmental Assessments "For Chemetall Foote Corporation", "Electric Drive Vehicle Battery and Component Manufacturing Initiative Kings Mountain, NC and Silver Peak, NV", Draft DOE/EA-1715-D, dated, April 27, 2010 and Final DOE/EA-1715 dated, September 2010, constitutes a **MAJOR PROJECT** consisting of numerous elements, with funding provided in-part by a public grant, thus requiring a full EIR/EIS because project involves improvements on County, Private, and Federal lands.

Further, the EIR/EIS must address plan or plans for refurbishing or developing new mining and or processing facility(s) which includes, also, one or more geothermal electrical generating facilities within Clayton Valley, Fish Lake Valley, Big Smokey Valley, Paymaster Canyon and Montezuma Valley, land area(s).

Thus, upon completion of the EIR/EIS regarding, Water Availability, Land Use. Environmental Issues, Energy, Transportation, Public Safety, Employment Opportunities, and the effects upon Alternative Land Uses that include, recreation, off-road activities, rock climbing, hunting, fishing, hiking, camping and cattle grazing, and other required elements, at least one (1) public scoping meeting(s)/hearing(s) will be held after timely posted NOTICE(s) posted locally for people living near project area to attend and submit public comments on/for the record and a Draft-Environmental Assessment will be distributed and made available for public review and comment.

Please respond to all questions and issues within ten (10) days, to,

Mr. Paul Rupp
Box 125
Silver Peak
Nevada 89047

Paul Rupp Date May 19, 2011
Paul Rupp

Paul Rupp, is a Nevada American, and a
concerned Esmeralda NV Parcel Owner- Esmeralda NV Registered Voter,
living near Proposed Major Project(s) Location(s)

Cc: Distribution List
And, Sent via Fax to the following, listed below,
Esmeralda NV County Board of Commissioners @775-485-6351
Esmeralda NV District Attorney @ 775-485-6356
Chemetall Foote Corporation, KM, NC @ 704-734 0208
Department of Energy-NETL @ 304-285-4403

U.S. Department of the Interior
Bureau of Land Management

Environmental Assessment # DOI-BLM-NV-B020-2012-0214-EA
DOE/EA-1921

DATE: October 2012

Silver Peak Area
Geothermal Exploration Project
ENVIRONMENTAL ASSESSMENT

Geothermal Lease: NVN-87008

Tonopah Field Office
P.O. Box 911
1553 S. Main Street
Tonopah, NV 89049
Phone: 775-482-7800
Fax: 775-482-7810

BLM

Tonopah Field Office

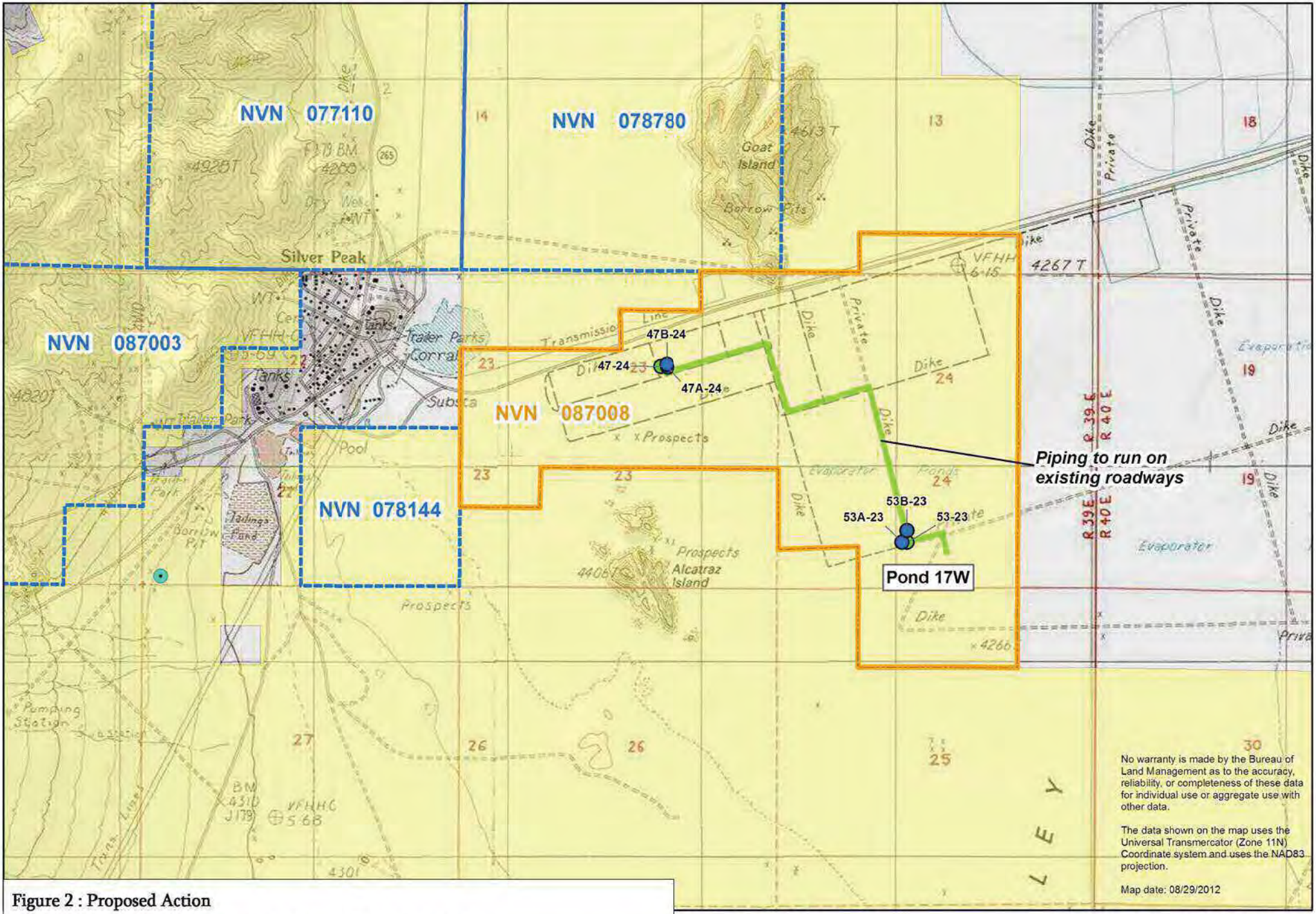


Figure 2 : Proposed Action

- Full-Size Well
- Observation Well
- Fresh Water Well
- Rockwood Lease
- Geothermal Leases

Land Status

- Bureau of Land Management
- Private

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone 11N) Coordinate system and uses the NAD83 projection.

Map date: 08/29/2012

United States Department of the Interior
Bureau of Land Management
Tonopah Field Office
P.O. Box 911
Tonopah, NV 89049

of the project area. Dispersed recreation activities occur in the vicinity and primarily include OHV use and camping.

3.3.12 Visual Resources

The project area is within the Great Basin section of the Basin and Range Province and characterized by linear desert mountains, separated by large desert plains, and dominant stands of low-growing vegetation such as sagebrush and yucca. In the specific project area, the well pads are located within an existing evaporation pond, and the area is heavily disturbed and covered with saline sediments.

Modifications in the vicinity that affect the natural landscape include a sprawling lithium mining operation (Rockwood's lithium mine) and electrical transmission and distribution lines.

The BLM initiated the visual resource management (VRM) process to manage the quality of landscapes on public land and to evaluate the potential impacts to visual resources resulting from development activities. VRM class designations are determined by assessing the scenic value of the landscape, viewer sensitivity to the scenery, and the distance of the viewer to the subject landscape. These management classes identify various permissible levels of landscape alteration, while protecting the overall visual quality of the region. They are divided into four levels (Classes I, II, III, and IV). Class I is the most restrictive and Class IV is the least restrictive (BLM 1986).

The proposed project area is located in a VRM Class IV area (Seley 2011). The objective of Class IV is to provide for management activities that require major modification to the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. Every attempt, however, should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements (BLM 1986).

3.3.13 Socio-Economic Values

The project area is located in Esmeralda County. As of the year 2010, Esmeralda County had a total population of 783 (BLM, BMDO 2011). The closest Census Designated Places (CDPs) to the project area are the city of Tonopah, in adjacent Nye County, having a year 2010 population of 2,478 (U.S. Census Bureau 2011) and the community of Silver Peak, having a year 2010 population of 107 (U.S. Census Bureau 2012).

As of 2009, Esmeralda County had 860 housing units. Approximately 52 percent of these units were occupied (BLM, BMDO 2011). The Tonopah CDP had 1,576 housing units, of which approximately 66.8 percent of these units were occupied. (U.S. Census Bureau 2011). The Silver Peak CDP had 133 housing units, of which 41.4% were occupied (U.S. Census Bureau 2012).

The total employment (2005-2009) for Esmeralda County was estimated to be 399 persons. Esmeralda County's leading employers included the agriculture/forestry/fishing and hunting/mining industries (25.8 percent), and public administration (16.5%) (BLM, BMDO 2011). The labor force for the Tonopah CDP was estimated in the year 2010 to be 1,308 persons. The Tonopah CDP leading employers included the service occupations (35.2 percent);

management, business, science and arts (23.8 percent); and natural resources, construction and maintenance occupations (26.9 percent); and the sales and office occupations (18.3 percent) (U.S. Census Bureau 2011). The U.S. Census provided a "2006-2010 American Community Survey 5-Year Estimate" for the Silver Peak CDP which estimated that 121 people were in the labor force with a +/-52 person margin of error (U.S. Census Bureau 2012).

3.3.14 Land Use Authorization

The project area is on public lands managed by the BLM. The proposed Project would be located within Rockwood's existing evaporation pond system. Land use within the vicinity of the proposed geothermal exploration wells includes existing access roads, power lines, industrial/extraction operations, and additional geothermal exploration activities.

Ten BLM authorizations have been granted within Sections 23 and 24, T.2S., R.39E.; these authorizations include:

- NVN-42582, a 10,710.94 acre site to Foote Mineral Company for lithium brine extraction;
- NVN-72542, a 620 acre site to Chemetall Foote Corporation for lithium extraction;
- NVN-002169, a 7.49 acre ROW to Sierra Pacific Power Company for a power transmission line;
- NVN-002552, a 0.12 acre ROW to Sierra Pacific Power Company for a power transmission line;
- NVN-051529, a 27.27 acre road ROW to Homestead Minerals;
- NVN-087008, a 900-acre geothermal lease to Chemetall Foote Corp.;
- NVN-089289, a 0.5 acre area to Chemetall Foote Corp. for geophysical exploration;
- NVN-089442, a 42.15 acre road ROW to the Esmeralda County Road Department;
- NVN-0043264, a 2,127.14 acre ROW to Sierra Pacific Power Company for a power transmission line; and
- NVN-0066325, a 4.591 acre site to Foote Mineral co. for plant watering.

required as conditions of approval. Further, the Project is located within an existing bermed evaporation pond, so in the event of a materials spill, it is unlikely that any spilled materials would overtop the berm and result in offsite impacts.

Many of the materials used during drilling are also flammable. Rockwood has developed an Emergency Fire Response/Preparedness and Action Plan that addresses mitigation of hazards and effective response. The goals of this plan are to protect personnel, the public and the environment and to protect the assets of Rockwood. The elements of the Emergency Fire Response/Preparedness and Action Plan include employee training in emergency notification and communication, rescue and medical response, evacuation, accountability, fire prevention and control, hazardous materials management, and working within the local authorities and Incident Command Structure.

The proposed Project would comply with BLM requirements to ensure that any geothermal fluid encountered during the drilling does not flow uncontrolled to the surface. These include the use of blow-out prevention equipment during drilling and the installation of well casing cemented into the ground. Each well would be equipped with appropriately designed and installed blow-out prevention equipment, as required by the BLM (43 CFR 3261.13 & 3262.10). Specifications of blow-out prevention equipment and action plans are required as a condition of approval for the BLM Geothermal Drilling Permit for each well

After drilling operations are completed, the liquids from the reserve pits would either naturally evaporate, or be removed as may be necessary to reclaim the reserve pits. Removed fluids would be taken to a facility designed to accept such waste. The non-hazardous, non-toxic residual solid contents of the pits would be mixed with the excavated rock and soil and buried by backfilling the reserve pit. The small quantities of solid wastes (paper trash and garbage) generated by the proposed Project would be transported offsite to an appropriate permitted landfill facility, likely the Tonopah landfill. Portable chemical toilet wastes would be removed by a local contractor. Because of these waste containment and disposal practices, no impacts are anticipated to result from solid or hazardous wastes generated by the proposed Project. The disposal of these wastes would be a residual effect of the proposed Project.

4.1.5 Water Quality (Surface and Ground) and Water Quantity

Records of water surface elevations of wells in the fresh water aquifer demonstrate a decline over time. This indicates withdrawals are exceeding recharge. There has been concern over the rate of decline of the fresh water aquifer. A 1998 study by Cyprus Foote Mineral Co. conducted two analyses of the fresh water aquifer: 1) a static/pumping water level decline analysis over time, and 2) a volumetric analysis. The study assumed that brine water exist at the 4200 foot elevation. Potable water was found as deep as 3980 feet [above sea level] (Jennings 2010). The study determined that at the then current rate of decline, 1.25 feet/year, the fresh water aquifer had a life of 27 years. The volumetric analysis predicted a life of 14 years. It should be noted that the volumetric analysis did not account for recharge to the fresh aquifer. The volumetric analysis was updated to include recharge. The assumed life of the fresh water aquifer was then calculated to be approximately 27 years.

A study of the fresh water aquifer conducted by Jennings (2010) based on data from 1998-2010 determined the rates of decline for the Rockwood wells at 0.5 feet/year, Silver Peak Well 1 at 0.17 feet/year and the Rockwood monitoring well (2002-2010) at 0.27 feet/year. The report

states that pumping rates are directly related to production of lithium and in recent years lithium production rates have declined.

Analysis of pumping and water surface elevation data for the Silver Peak wells and Rockwood supply and monitoring wells indicate that the additional water required by Rockwood, 21.03 – 41.89 acre-feet (7.01 – 13.96 acre-feet/year) over the anticipated 3-year life of the exploration Project, would increase the rate of decline of the fresh water aquifer. The estimated decrease in water surface elevations in the fresh water aquifer was calculated as approximately 0.02 – 0.04 ft/year over the life of the Project.

This analysis is based on Rockwood pumping and water surface elevation data for 2000-2010, the period for which data was available. A second analysis involved using a modified version of the volumetric analysis in the 1998 report. The volumetric analysis requires assumption regarding the lateral extent and specific yield of the aquifer. The aquifer is conceptualized as a homogeneous block. The analysis included recharge based on PRISM precipitation data and methods described in Eakin et al (1951).

In an effort to protect water resources, the following applicant committed practices would be utilized:

- Each observation and full-sized well would be cased with steel casing cemented into the ground, which is designed to prevent contamination of any groundwater by the geothermal fluid and prevent the loss of any geothermal resource into other aquifers.

- Each observation and full-sized well would be drilled using non-toxic drilling mud to prevent loss of substantial drilling fluids into the rock.

- Reserve pits would be constructed at each site for the containment and temporary storage of drilling mud, drill cuttings and storm water runoff from the constructed well pad. The well driller would maintain a minimum of two feet of freeboard at all times in the reserve pits.

- Any injection test conducted on the exploration wells would only inject produced geothermal fluid through the cased well back into the geothermal reservoir from which it originated, ensuring that there would be no affect on the quality of groundwater. Chemical analyses of the produced geothermal fluid would be conducted to characterize the geothermal fluids.

Figure 2 shows that the proposed well pads are located within dikes. These well pads would be constructed using aggregate resulting in the pads being elevated up to 3 feet above the grade of the ponds. Most precipitation falls in the mountains with surface runoff being collected and routed through ephemeral stream channels to the playa. In the event that storm runoff reached the valley floor, the dikes surrounding the well pads would prevent them from receiving this runoff. No impacts from storm water runoff are anticipated.

Precipitation from storms can fall directly within the diked area. The possibility of the pads flooding as a result of direct rainfall is extremely low. NOAA point precipitation frequency estimates for the 100 year event in the area of the pads are: 15 minutes = 0.658 inches, 30 minutes = 0.886 inches, 60 minutes = 1.1 inches. In the unlikely event that water within the diked area threatens to flood the well pads, the water will be pumped to other nearby evaporation ponds or to the playa. No impacts from a 100-year rainfall event are anticipated.

5. CUMULATIVE IMPACTS ANALYSIS

The CEQ regulations for implementing NEPA (40 CFR 1508.7) define cumulative impacts as:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

The following analysis identifies other past, present, or reasonably foreseeable future actions that, together with the proposed Project, may incrementally impact the environment, and addresses the potential cumulative impacts of these actions and the proposed Project.

5.1 CUMULATIVE EFFECTS STUDY AREA

The Cumulative Effects Study Area (CESA) for socioeconomic impacts is Esmeralda County and portions of Nye County, particularly the Tonopah Census Designated Place.

The CESA for the remaining resources analyzed in this EA is the Clayton Valley Hydrographic Area (Number 143) of the Central Hydrographic Region (Number 10), as designated by the Division of Water Resources of the Nevada Department of Conservation and Natural Resources (NDCNR-DWR). This hydrographic area totals 380,800 acres (Figure 4).

5.2 PAST AND PRESENT ACTIONS

Past and present activities consist principally of mineral exploration and production activities; geothermal exploration drilling; livestock grazing; and dispersed recreation.

The CESA contains the community of Silver Peak, which is approximately 1 mile west of the project area. The 2006 population of Silver Peak was approximately 117 persons (Esmeralda County 2010).

At various times for more than 100 years, the Silver Peak area has been investigated for precious metals, lithium, potash, water resources, and geothermal resources. This has led to the drilling of a number of wells and small-diameter holes within the CESA, including Rockwood's leasehold.

Blair, now a ghost town, is located 3 miles north of Silver Peak. The site of Blair was established in 1906 when the Pittsburg Silver Peak Gold Mining Company constructed the Blair mill, a 100-stamp mill, in operation from 1907 through 1916.

Rockwood (N-72542) and its predecessor entities currently operate a lithium brine mining and processing facility in the area, and have been extracting lithium from the playa brines since 1965. Rockwood and its predecessor entities have drilled a number of wells within the Clayton Valley basin where the Project is proposed.

There are three active authorized geothermal exploration projects with the CESA. Sierra Geothermal Power (SGP) received BLM approval of the Silver Peak Geothermal Exploration Project in April 2008 to drill up to 14 temperature gradient holes and up to 6 slim wells and 6 full-sized wells within the Silver Peak leases. These leases surround the community of Silver Peak and extend northward approximately five miles. To date, only one geothermal well located approximately 1.7 miles northwest of the proposed project has been constructed on the Silver peak leases. In July 2009, SGP received BLM approval of the Alum Geothermal Exploration Project to drill 32 temperature gradient holes and 17 observation wells within their Alum leases, which are located approximately 11 miles north of the proposed project. To date, two geothermal wells have been drilled on the Alum leases. SGP has since been purchased by Ram Power.

In April 2011, Ram Power received BLM approval of the Clayton Valley Geothermal Exploration Project to drill up to 18 geothermal exploration wells within their Clayton Valley leases, located from 2 to 9 miles north and east of the proposed project. To date, no geothermal wells have been drilled on these leases.

Six miles northwest of Silver Peak, Golden Phoenix Minerals (N-73109) operates the Mineral Ridge Gold Mine within the CESA. The mine is currently working on a heap leach pad, crushing ore, and preparing to begin leaching. The mine has submitted a Mine Plan of Operations amendment to include exploration drilling. The Sunshine Mining Company previously produced ore from the Mineral Ridge Mine, and from Sixteen-to-One Mine in the CESA, 13 miles west southwest of Silver Peak.

Sand, gravel, and stone are produced within the CESA. The Goat Island quarry produces ballast to line Rockwood's pond boundaries and sand and gravel are produced from both south and north of Silver Peak along SR 265.

5.3 REASONABLY FORESEEABLE FUTURE ACTIONS

For this analysis, it is assumed that the foreseeable future is the approximate 3-year period for implementation of the Proposed Action plus a subsequent 3-year period for the completion of reclamation. It is assumed that recreational activities, livestock grazing, and mineral exploration activities associated with the CESA would continue into the reasonably foreseeable future, though the relative intensity of these actions could vary depending on a variety of factors, such as a sluggish economy. Given that the reasonably foreseeable future period is a three year window, it is assumed that the reasonably foreseeable future actions will continue in the same manner and to the same degree as they have been conducted in the present and recent past

Section 368 of the Energy Policy Act of 2005 directs the Secretaries of Agriculture, Commerce, Defense, Energy and the Interior (the agencies) to, under their respective authorities, designate corridors on federal land in the 11 Western States for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). On November 16, 2007, the Agencies released for public review and comment a Draft Programmatic Environmental Impact Statement (Draft PEIS) addressing the environmental impacts from the Proposed Action and a range of alternatives. Detailed maps show that an energy corridor is proposed within the CESA.

The Mineral Ridge Mine, located 5 miles northwest of Silver Peak has filed a Mine Plan of Operations amendment to include exploration drilling and is currently undergoing NEPA evaluation.

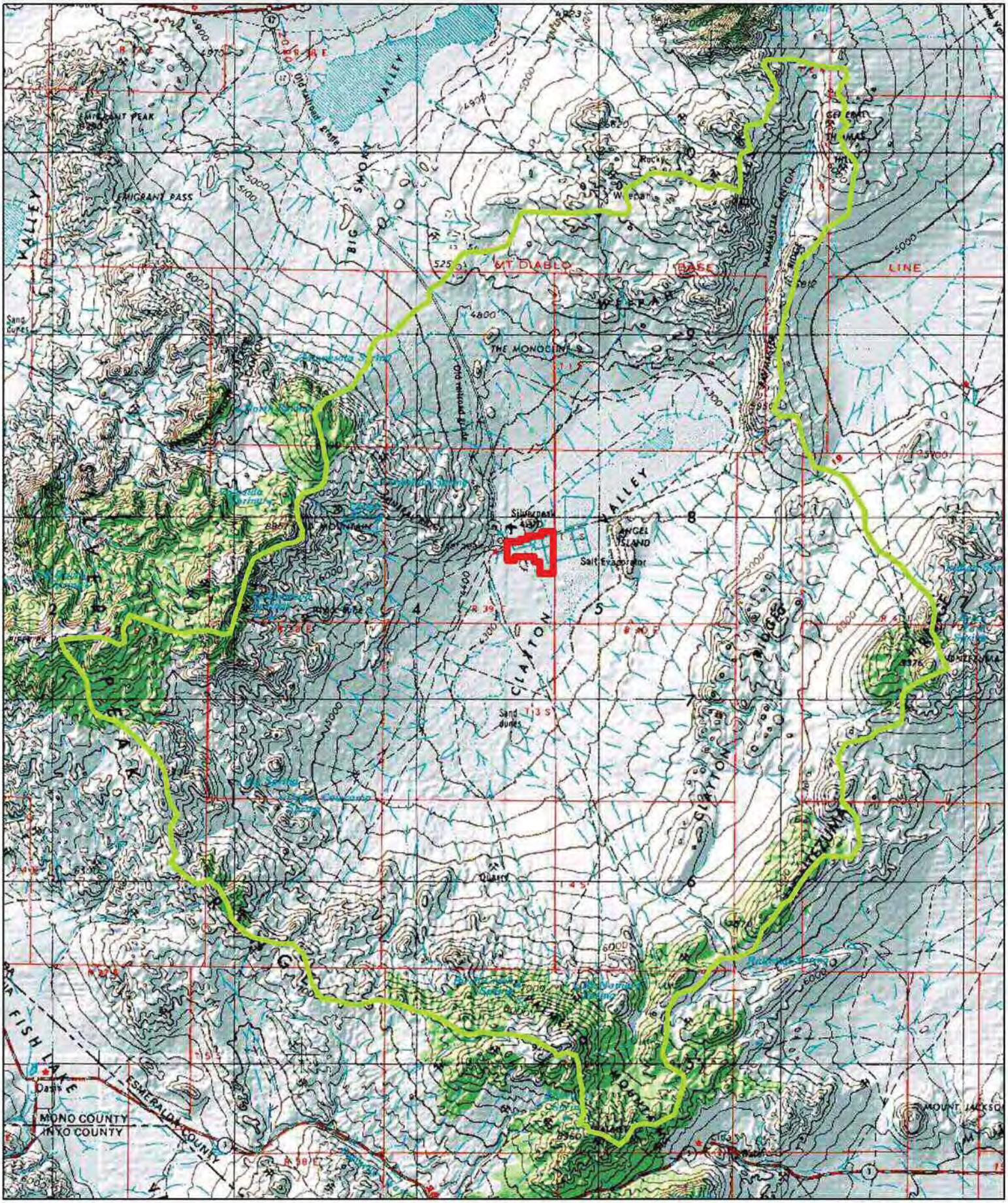


Figure 4 : Cumulative Effects Study Area

Lease Boundary

Hydrographic Area Boundary

0 2.5 5 Miles

United States Department of the Interior
Bureau of Land Management
Tonopah Field Office
P.O. Box 911
Tonopah, NV 89049

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

The data shown on the map uses the Universal Transmercator (Zone11N) Coordinate system and uses the NAD83 projection.

Map Date: 04/20/2012

Rockwood has been approved to drill temperature gradient holes.

Rodinia Lithium Company has submitted a Plan of Operations to the Tonopah Field Office for lithium exploration wells north and south of Rockwood.

Geoxplor currently has a pending notice N-89179 to drill for lithium.

There are no other known or anticipated actions with the potential for creating additional cumulative impacts in the reasonably foreseeable future. All future projects proposed within the CESA would be analyzed in separate site-specific environmental analyses.

5.4 CUMULATIVE IMPACTS FOR THE PROPOSED ACTION

5.4.1 Air Quality

Fugitive dust would be generated from any surface-disturbing activities and travel on unpaved roads during exploration activities. Mineral exploration activities typically minimize fugitive dust by watering the disturbed ground, as necessary. The operation of diesel engines associated with these same activities would also emit small quantities of criteria air pollutants (NO_2, SO_2, CO, and PM_{10}), criteria air pollutant precursors (VOCs), and air toxics (small quantities of diesel PM, acetaldehyde, benzene, and formaldehyde). These emissions are temporary and the air quality standards for this area are not expected to be exceeded. Any cumulative impacts to air quality are anticipated to be negligible.

5.4.2 Cultural Resources

As the Project would have no effect on cultural resources, the Project would not contribute to any cumulative impacts to cultural resources.

5.4.3 Native American Religious Concerns

As no Native American religious concerns were identified for the proposed Project, the Project would not contribute to any cumulative impacts to Native American religious concerns.

5.4.4 Hazardous Materials and Wastes

The Proposed Action would include generation and proper disposal of solid and hazardous wastes. The Project could also result in minor petroleum hydrocarbon or other hazardous material spills. However, no soil, groundwater or surface water contamination is anticipated. No adverse effects to the environment or worker health and safety are anticipated.

Hazardous materials are expected to be used by both the non-renewable and renewable future mineral exploration activities (including Rockwood's lithium mining operations), This includes the use of petroleum fuels (principally diesel fuel), hydraulic fluid, lubricants and drilling chemicals and materials. Non-hazardous solid waste and liquids could also be generated by the other reasonably foreseeable future actions.

Cumulative effects to the environment from hazardous or solid wastes are expected to be negligible.

5.4.5 Water Quality (Surface and Ground) and Water Quantity

Currently, Rockwood and the Town of Silver Peak are pumping from the fresh water aquifer. Projects within the CESA which have the potential to decrease the water level in the aquifer are shown in Table 7 below.

Table 7 Effects of Pumping to Aquifer

		Acre-feet/year	Approximate Decrease Water Level (feet/year)
1	Jennings (2010) 1998-2010	Not Reported	0.4
2	Rockwood Geothermal Exploration	7.01 – 13.96	0.02 – 0.04
3	Clayton Valley Geothermal Exploration Pjt.	67	0.2
4	Rockwood Additional Pumping	160	0.5
5	Lithium Exploration (Rodinia and Geoxplor)	11	0.04
6	Proposed Increases	245.01 – 251.96[1]	0.76 – 0.78[1]
	Cumulative Total	503.92	1.18[2]

1 This represents the total of lines 2-5.
2 This represents the total of lines 1 and 6.

Any rate of pumping that exceeds the rate of recharge of the fresh water aquifer would decrease the amount of fresh water stored in the aquifer. Increasing the rate of withdrawal would shorten the life of the aquifer as a potable water supply.

Rockwood's withdrawal of water would lower the water surface elevation of the aquifer approximately 0.02 – 0.04 feet/year over the life of the Project, which represents less than 1% of the total water pumped based on data for the period 1998-2010. This represents a negligible impact on the operation of the Rockwood or Silver Peak wells. The reduction in water surface elevations as result of this project would not result in an increase in the cost of pumping or resetting the pump intakes. Water surface elevations would remain well above the bottoms of the well screens.

There is little water quality data available for the Silver Peak wells. Data on Total Dissolved Solids (TDS) was first collected on 8/14/2006. The TDS was measured at 680 mg/l (pumping ~ 34 gpm). A constant discharge pump test, 250 gpm, was conducted in October 2009. The measured TDS was 719 mg/l. The next test result available, 9/07/2010, showed a TDS of 690 mg/l. It appears that TDS levels dropped with a reduction in pumping. The TDS levels did not exceed the Nevada standard, 1000 mg/l. Based on these few water quality data and given the continued current and reasonably foreseeable future pumping of water from the aquifer, it is probable that water quality will decline over time. However, the minimal increase of 42 acre-feet at the proposed pumping rate over the three-year projected life of the Proposed Action will have a negligible cumulative effect on water quality.

5.4.6 Minerals

Under the proposed Project, only 5.6 acres of land is proposed to be disturbed. As such, there is little potential for any conflict between the Proposed Action and any future locatable mineral claim activity that may be proposed on these same lands during the same period. Neither party (the geothermal lessee nor potential future mineral claimants) may proceed with operations on

designation and compliance, the proposed Project would not substantially add to the cumulative effects.

5.4.13 Socio-Economic Values

Economic impacts would be expected from the exploration activities. Most of the exploration work force would be specialized workers from outside the area, although some of the mineral exploration construction materials could be purchased from local merchants. Some impacts may be realized from the purchase of meals, entertainment, and other goods and services by construction workers. The contribution of the proposed Project to these cumulative effects on economic values would be positive, small and short term.

5.4.14 Land Use Authorizations

As the Project would have no effect on land use authorizations, the Project would not contribute to any cumulative impacts to land use authorizations. The valid, existing rights of the federal geothermal leases noted in Section 1.1 would be addressed when granting new approvals within the project area.

5.5 NO ACTION ALTERNATIVE

None of the proposed geothermal drilling Project activities would be undertaken if the No Action Alternative is selected. There would be no cumulative effects from the proposed Project on any of the identified resources or activities from implementation of the No Action Alternative.

5.6 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Ground water or mineral resources could be damaged if wells leak or if the subsurface flow paths are changed as a result of geothermal exploration. To minimize this potential, geothermal wells would be designed, constructed, and operated in accordance with BLM and State of Nevada requirements. Although unlikely, such incidents could occur, and the resultant damage would be irreversible. Heat extracted from geothermal fluids during well testing would constitute an irreversible and irretrievable commitment of the thermal resource.

6. RECOMMENDED MITIGATION AND MONITORING

The BLM requires that decisions be implemented in accordance with the appropriate decision document (Decision Record/Finding of No Significant Impact). Monitoring is needed to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the decision. The BLM would fulfill this responsibility by monitoring the implementation of mitigation measures adopted as conditions of approval to the submitted Operations Plan and Geothermal Drilling Permits, as well as the stipulations attached to the geothermal lease.

The following recommended mitigation and monitoring measures were developed through the analysis conducted in this EA.

- The reserve pit shall maintain a minimum two feet of freeboard at all times.

- Initial ground-disturbing activities would not be conducted during the migratory bird nesting season (March 30 through August 15), unless necessary, and only after a qualified biologist first inventories for migratory birds and nests. This survey would be conducted to identify either breeding adult birds or nesting sites within 100 m. of the specific areas to be disturbed. If active nests are present within these areas to be disturbed, Rockwood would coordinate with the BLM or appropriate state officials, as applicable, to develop appropriate protection measures, which may include avoidance, construction constraints, and/or the establishment of buffers.

- Wellhead equipment left on the drill site following the completion of drilling would be painted a color which would blend with the landscape, pursuant to BLM Instructional Memorandum (IM) 2007-021 and the Gold Book (USDI and USDA 2007). Prior to paint selection, Rockwood would contact the Tonopah Field Office Project lead for concurrence.

- Given the importance of maintaining dark sky conditions, conscious efforts would be made to protect the current dark skies from light pollution. All drill rig and facility lights would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner that focuses direct light to the immediate work area.

- To minimize the potential for the spread of noxious and invasive weeds in the project area, all construction vehicles and equipment would be cleaned of all soil and plant material using high-pressure equipment (compressed air or water) prior to arrival at the work site.

- The Project site would be monitored over the life of the Project to determine the presence of any invasive, noxious, and non-native species. Invasive, noxious, and non-native species that have been identified during monitoring would be promptly treated and controlled. A Pesticide Use Proposal (PUP) would be submitted to the BLM Tonopah Field Office for approval prior to the use of herbicides.

7. COORDINATION AND CONSULTATION

7.1 LIST OF PREPARERS

BLM Battle Mountain Renewable Energy Coordination Office (RECO)
Tim Coward, Battle Mountain District, Project Manager
Larry Grey, Battle Mountain District, Hydrologist
William Coyle, Battle Mountain District, GIS Specialist
Wendy Seley, Battle Mountain District, Realty Specialist
Michael Wissenbach, Battle Mountain, Planning and Environmental Coordinator

BLM Tonopah Field Office
Devin Englestead, Wildlife Biologist
Karen Goldsmith, Legal Clerk
John Hartley, Planning and Environmental Coordinator
Marc Pointel, Supervisory Rangeland Management Specialist
Susan Rigby, Cultural Resources Specialist

U.S. Department of Energy, National Energy Technology Laboratory
William J. Gwilliam, Physical Scientist/Project Manager
Mark L. McKoy, Senior Management Regulatory & Technical Advisor

Environmental Management Associates
Heather Altman, Senior Environmental Specialist
Dwight L. Carey, Principal
Erin Wielenga, Environmental Specialist

7.2 AGENCIES, GROUPS, AND INDIVIDUALS CONTACTED

Native American Contacts
Death Valley Timbisha Shoshone Tribe of California

Rockwood Lithium Inc., (formerly Chemetall Foote Corporation)
Arnold Wolf, Senior Project Manager
Mike Stevens, Project Manager

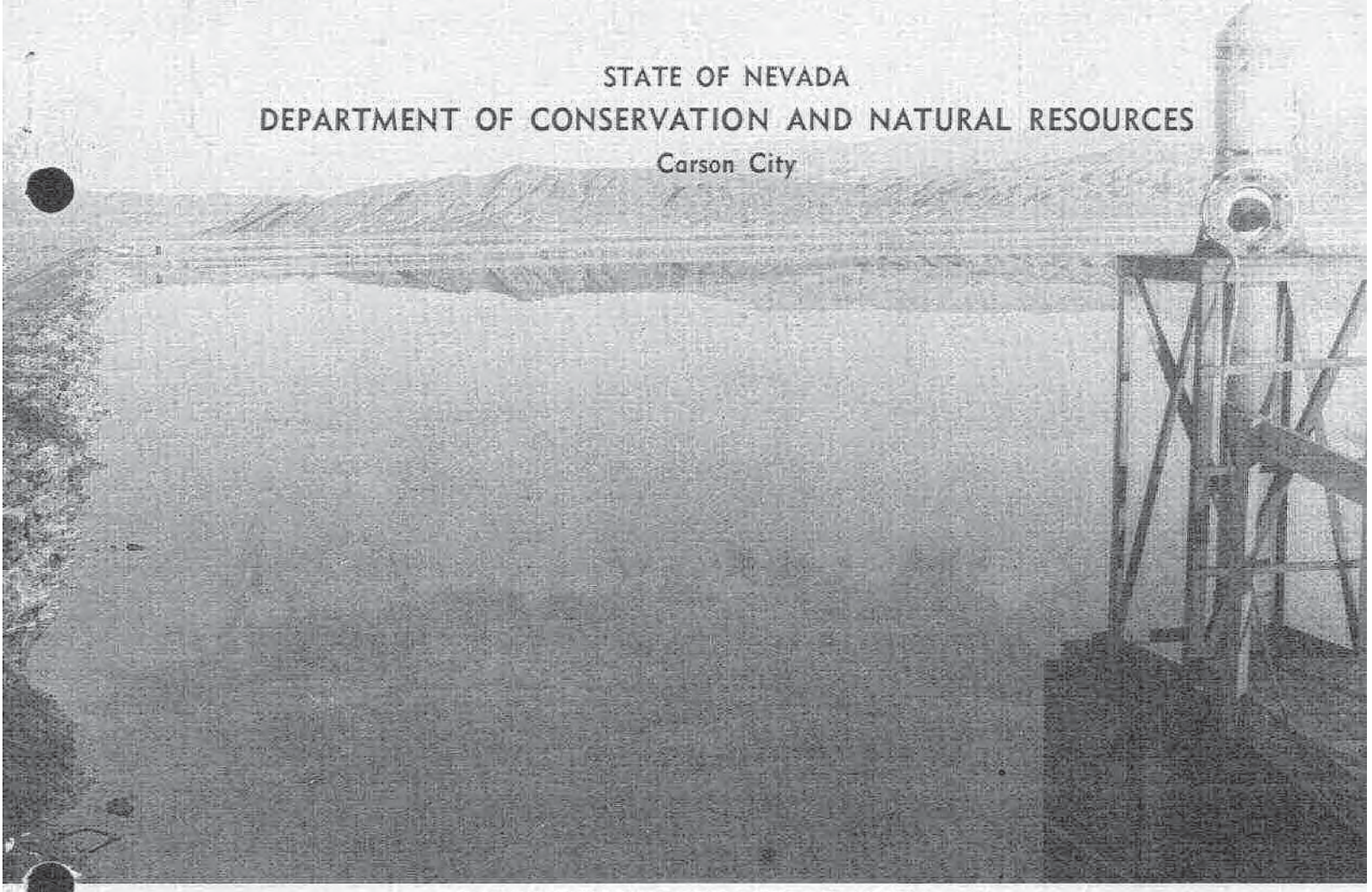
Jacobs
James Miller, Project Manager

Nevada Natural Heritage Program
Eric Misgow, Data Manager

STATE OF NEVADA

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

Carson City



Evaporation pond for concentrating lithium on Clayton Valley playa.

WATER RESOURCES–RECONNAISSANCE SERIES

REPORT 45

WATER-RESOURCES APPRAISAL OF CLAYTON VALLEY-STONEWALL FLAT AREA, NEVADA AND CALIFORNIA

By

F. Eugene Rush

Prepared cooperatively by the

Geological Survey, U.S. Department of the Interior

MAY 1968

Table 1.--Hydrologic summary

/All water estimates in acre-feet per year, except where noted/

	Clayton Valley	Alkali Spring Valley	Lida Valley	Stonewall Flat	Oriental Wash	Grapevine Canyon
Approximate growing season (days)	150-180	140-180	140-180	140-180	140-180	150-180
Valley area (sq mi)	518	320	535	342	172	158
Surficial drainage character	(a)	(a)	(b)	(a)	(b)	(b)
Surface-water runoff from mountains	3,500	400	1,600	400	1,000	500
Ground-water recharge from precipitation	1,500	100	500	100	300	50
Subsurface inflow	18,000	5,500	200	--	0	500
Preliminary estimate of perennial yield	22,000	3,000	350	100	150	400
Preliminary estimate of transitional storage reserve[1]/	450,000	30,000	600,000	350,000	180,000	0
Present ground-water development (rounded)	2,000	40	30	minor	10	10

Revised estimate of inflow to the report area from Ralston and Stonecabin Valleys is 5,500 acre-feet per year.

1. Total acre-feet.

a. Internal drainage.

b. External drainage.

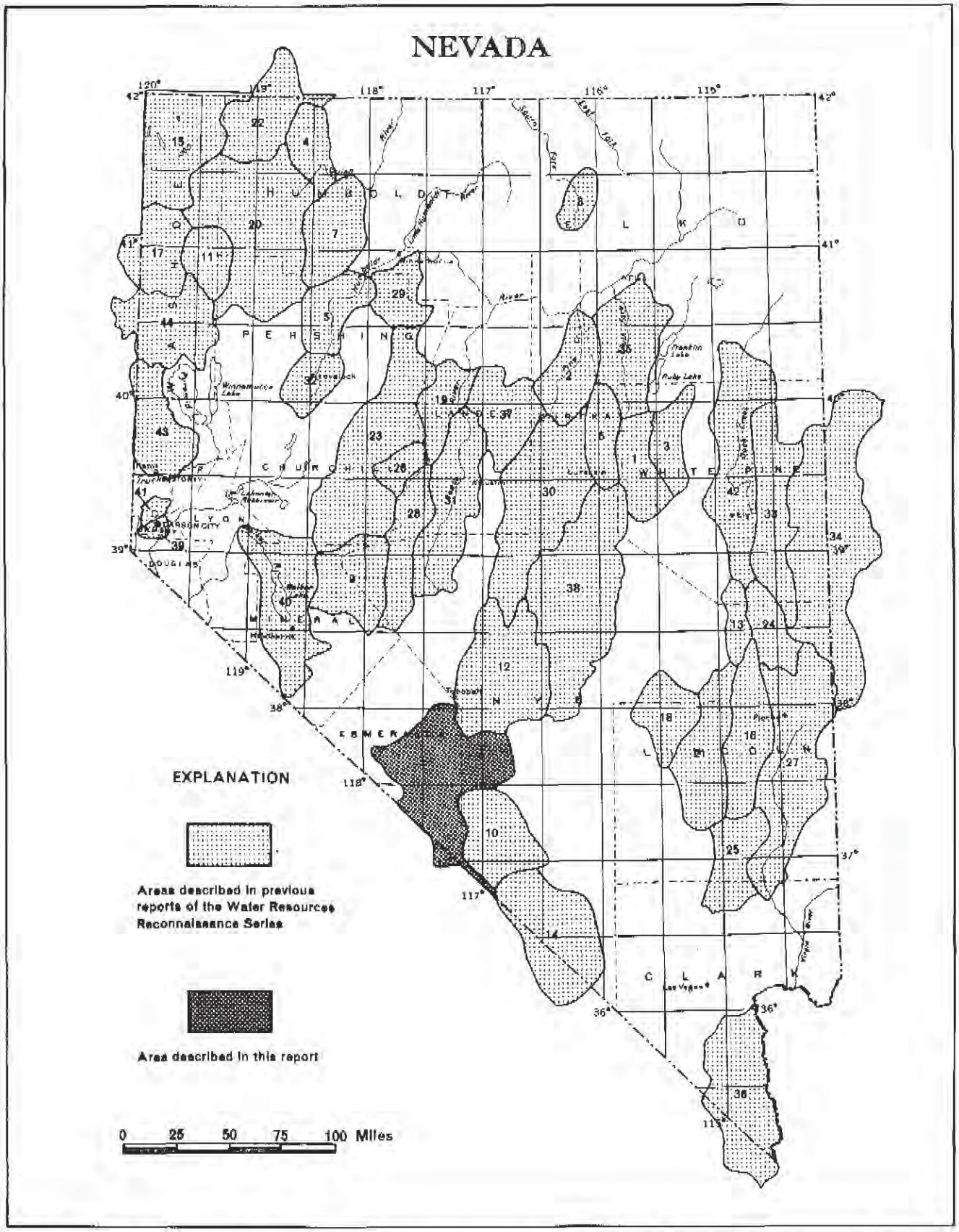


Figure 1.—Area described in this report and others in previous reports of the Water Resources—Reconnaissance Series

(at Silver Peak and Goldfield) and 1933-40 (at Palmetto, Lida, and Divide). According to Lincoln (1923), Goldfield had a population of 8,000 in 1905 and 20,000 in 1908. For the period 1903-21 the production of gold, copper, and silver at Goldfield was valued at $85 million.

Note

As Goldfield grew, more water was needed to supply mills, for fire protection, and for domestic use. A 47-mile pipeline system was constructed to carry water from several springs near Lida, across the northern part of Jackson Flat, to Goldfield (Meinzer, 1917, p. 151). Poorer quality water from Alkali Spring and wells on the southeastern edge of Alkali Spring Valley playa were used to supplement flow in the pipeline and wells when the Lida supply was inadequate. A present resident of Goldfield indicated that the Lida system ruptured, due to freezing in abnormally cold weather during the winter of 1919, and was not used after that event. Wells at Goldfield have been exclusively used since 1919.

Numbering System for Hydrologic Sites

The numbering system for hydrologic sites in this report is based on the rectangular subdivision of the public lands, referenced to the Mount Diablo base line and meridian. It consists of three units: The first is the township north (N) or south (S) of the base line; the second unit, separated from the first by a slant, is the range east of the meridian; the third unit, separated from the second by a dash, designates the section number. The section number is followed by a letter that indicates the quarter section and quarter-quarter section where applicable, the letters a, b, c, and d designate the northeast, northwest, southwest, and southeast quarters, respectively. For example, well 2S/40-18da is the well recorded in the NE¼ SE¼ section 18, T. 2 S., R. 40 E., Mount Diablo base line and meridian.

< 2S/40-18da

Because of limitation of space, wells and springs are identified on plate 1 only by section number, quarter section or quarter-quarter section letters. Township and range numbers are shown along the margins of the area on plate 1.

NW	NE
b	a
SW	SE
c	d

dissected, poorly sorted, and commonly somewhat deformed.

Younger alluvium is late Pleistocene and Recent in age (Albers and Stewart, 1965). In contrast to older alluvium, it generally is unconsolidated, undissected, moderately well sorted, and undeformed. It is composed of sand, silt, and clay deposited by the principal streams on the valley floor. Younger alluvium includes the lake and playa deposits and alluvial-fan deposits. The coarse-grained material of the younger alluvium probably is more porous and more permeable than the older alluvium.

Note

In Clayton Valley, beneath the playa, thick beds of salt have accumulated. Dole (1912) described the source of the salt deposits, the method of exploration, and the commercial possibilities of the playa. (Dole called the playa Silver Peak Marsh.) Well 2S/39-12c penetrated four salt beds totaling a thickness of 26 feet in the upper 130 feet of alluvium (table 16). The log of well 2S/40-18da lists 61 feet of salt in the upper 154 feet of alluvium. The thickest bed recorded is 32 feet, encountered from a depth of 122 to 154 feet. These beds probably are both younger and older alluvium.

Note

Most of the economically available ground water in the report area is stored in the younger and older alluvium which comprise the valley-fill reservoir.

Faults were mapped by Albers and Stewart (1965) and others inferred by the writer from aerial photos. Only those that form boundaries between lithologic units or cut the valley-fill reservoir are shown on plate 1.

Climate

Air masses that move across this part of Nevada characteristically are deficient in moisture. The valleys are arid, whereas the higher mountains are subhumid and receive more precipitation, especially in the winter. Thunderstorms provide most of the precipitation during the summer. A further discussion of precipitation is included in the Precipitation Section of this report.

Temperature data have been recorded at five nearby stations; table 3 and figure 2 summarize the freeze data for these stations. Because killing frosts vary with the type of crop, temperatures of 32°F, 28°F, and 24°F are used as indicators of the length of growing season.

VALLEY-FILL RESERVOIRS

Extent and Boundaries

Younger and older alluvium of the valleys, as shown on plate 1, form the valley-fill reservoirs that are the principal source of ground water in the area. Few deep wells have been drilled in the area; therefore little is known about the thickness of the valley-fill reservoirs. In Clayton Valley, well 3S/39-11a (tables 14 and 16) was drilled to a depth of 1,820 feet, but no bedrock was reported. In Lida Valley, the owner of well 5S/43-17c reports that consolidated rock was encountered at a depth of 600 feet. The reservoirs beneath the valley floors probably are at least 500 feet thick in most valleys, and at the center of Clayton and Alkali Spring Valleys and Stonewall Flat they probably are several times as thick. Although bedrock reportedly was encountered in wells at shallower depths, these wells were near the bedrock-alluvium contact where the valley-fill reservoir is generally thin.

External hydraulic boundaries are formed by the consolidated rocks (pl. 1) that underlie and form the sides of the valley-fill reservoirs. These lateral boundaries are leaky to varying degrees. Further, the carbonate rocks may contribute moderate amounts of recharge from the mountains to the valley-fill reservoir by subsurface flow.

The principal internal hydraulic boundaries are the faults that cut the valley fill in the several valleys (pl. 1), and lithologic changes. The extent to which these barriers impede ground-water flow probably will not be determined until substantial ground-water development occurs.

Regional Ground-Water Flow

Figure 3 shows diagrammatically the regional ground-water flow as determined by the water-level data in the study area. Three "sinks," or terminal discharge areas are identified: (1) a system which terminates in Clayton Valley, (2) a system which generally terminates in Sarcobatus Flat, adjoining the southeast edge of the report area, and (3) a system which terminates in Death Valley, southwest of the report area.

Clayton Valley apparently receives substantial ground-water flow from Big Smoky Valley. In addition, part of the ground-water flow from Ralston and Stonecabin Valleys

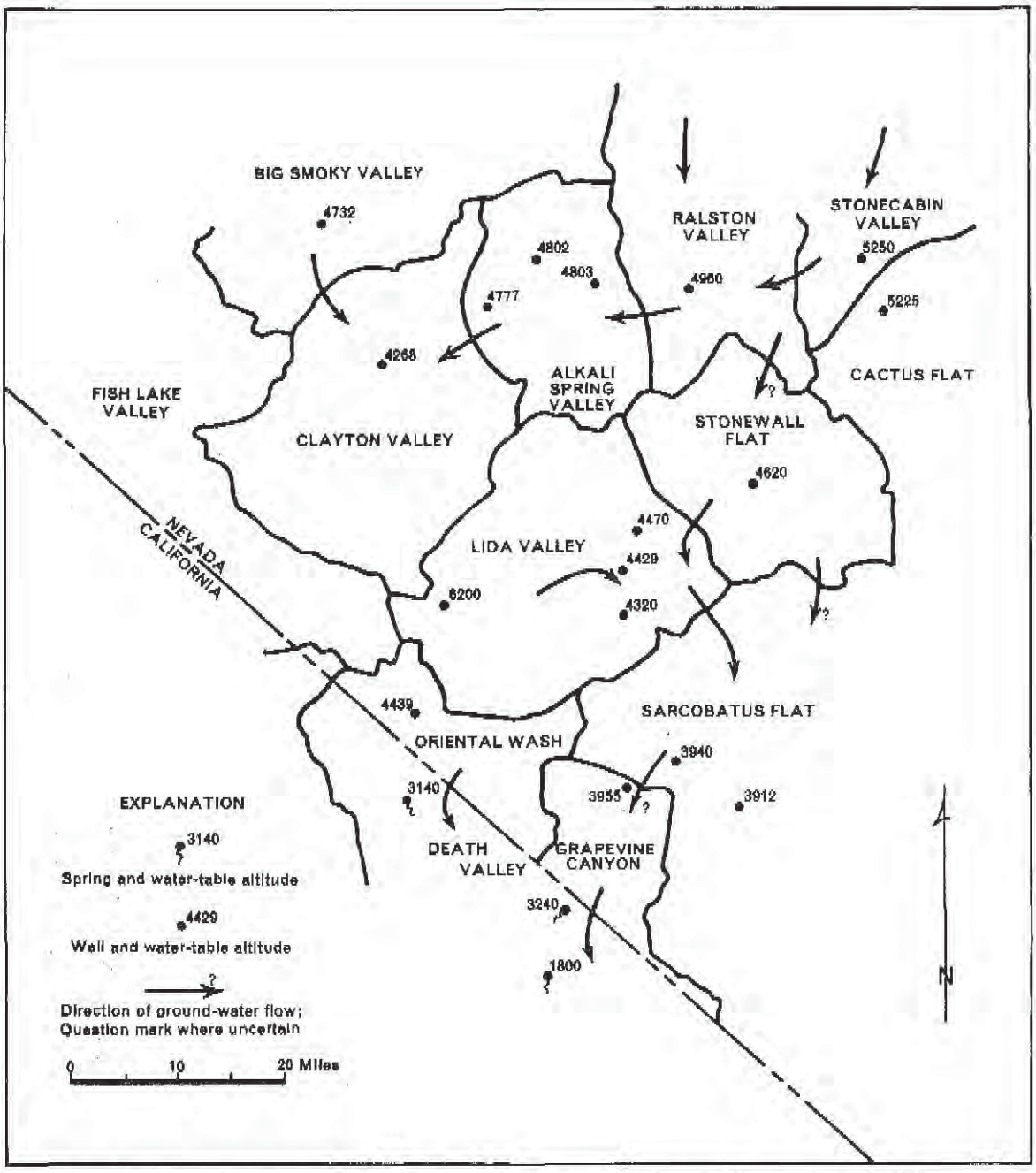


Figure 3.—Generalized map of intervalley ground-water flow as interpreted from water-level data

Table 5.--Estimated average annual precipitation and ground-water recharge

Precipitation zone (altitude in feet)	Area (acres)	Estimated annual precipitation: Range (inches)	Average (feet)	Average (acre-feet)	Estimated recharge from precipitation: Percentage of precipitation	Acre-feet per year
CLAYTON VALLEY						
Above 9,000	680	>15	1.5	1,000	15	150
8,000-9,000	7,040	12-15	1.1	7,700	7	540
7,000-8,000	32,300	8-12	.8	26,000	3	780
Below 7,000	292,000	<8	.5	150,000	minor	--
Total (rounded)	332,000	--	--	180,000	---	1,500
ALKALI SPRING VALLEY						
Above 7,000	3,560	>8	.8	2,800	3	85
Below 7,000	201,000	<8	.5	100,000	minor	--
Total (rounded)	205,000	--	--	100,000	--	100
LIDA VALLEY						
Above 8,000	2,170	>12	1.1	2,400	7	170
7,000-8,000	14,300	8-12	.8	11,000	3	330
Below 7,000	326,000	<8	.5	160,000	minor	--
Total (rounded)	342,000	--	--	170,000	--	500
STONEWALL FLAT						
Above 8,000	100	>12	1.1	110	7	10
7,000-8,000	2,220	8-12	.8	1,800	3	50
Below 7,000	217,000	<8	.5	110,000	minor	--
Total (rounded)	219,000	--	--	110,000	--	100

Table 7.--Estimated average annual runoff

	Runoff area (acres)	Estimated average annual runoff (acre-feet)
Clayton Valley:		
Montezuma Peak, Clayton Ridge, and Palmetto Mountains	53,000	1,700
Silver Peak Range, Weepah Hills, and Paymaster Ridge	37,000	1,800
Total (rounded)	90,000	3,500
Alkali Spring Valley	27,000	400
Lida Valley	77,000	1,600
Stonewall Flat	31,000	400
Oriental Flat	44,000	1,000
Grapevine Canyon	24,000	500

Table 8.--Estimated average annual evapotranspiration of ground water[1/]

[Phreatophyte areas shown on plate 1]

Areas of phreatophytes and playas	Area (acres)	Depth to water (feet)	Evapotranspiration: Acre-feet per acre	Evapotranspiration: Acre-feet (rounded)
CLAYTON VALLEY				
Bare soil (playa)				
Standing water (free-water surface)	1,000	--	5.0	5,000
Very shallow ground water	14,000	0-1	1.0	14,000
Shallow ground water	4,000	1-5	.25	1,000
Subtotal	a 19,000	--	--	-- 20,000
Greasewood and saltbush	5,000	10-40	.2	1,000
Saltgrass, rabbitbrush, and tules	3,000	0-10	1.0	3,000
Total (rounded)	27,000	--	--	b24,000
ALKALI SPRING VALLEY				
Greasewood and rabbitbrush	3,500	30-50	.1	350
Bare soil (playa)	4,500	40-50	c --	--
Saltgrass, willow, and cottonwood	2	1-10	1.0	2
Total (rounded)	9,300	--	--	400

1. Only minor amounts of ground water are discharged by evapotranspiration in Lida Valley, Stonewall Flat, Oriental Wash, and Grapevine Canyon. Most of the discharge is associated with small springs and is not included in the table.

a. Meinzer (1917, p. 144) estimated the area of the playa as 25,000 acres. This estimate of 19,000 acres was made from aerial photographs and field checked at widely scattered points.

b. Meinzer (1917, p. 145) estimated the total discharge at "several thousand acre-feet a year."

c. Depth to water probably too large for any measurable evaporation from the playa.

Table 9.--Summary of estimated net well pumpage in 1966

/All quantities in acre-feet per year/

Valley	Industrial	Public supply	Domestic	Stock-watering	Total (rounded)
Clayton Valley	a 2,000	--	10	10	2,000
Alkali Spring Valley	--	b 20	10	10	40
Lida Valley	--	--	10	10	20
Stonewall Flat	--	--	--	--	minor
Oriental Wash	--	--	--	10	10
Grapevine Canyon	--	--	--	--	minor
Total	2,000	20	30	40	2,100

a. Foote Mineral Company reports a gross pumpage of 3,000 acre-feet in 1966, but they assume about a third of the pumpage returns to the ground-water system by infiltration from their evaporation ponds.

b. Based on a consumption of 100 gallons per day per person by an estimated population at Goldfield of 150.

Springs

In the mountains of the area, small springs issue from consolidated rocks. In most valleys their combined discharge is minor; they support small areas of willow, rabbitbrush, and wildrose. Much of their flow seeps back into the ground and reenters ground-water storage. Table 15 presents data on selected springs.

The largest springs in the area probably are Waterworks Springs (2S/39-22a) at Silver Peak in Clayton Valley. Dole (1912, p. 5) and Meinzer (1917, p. 143) report the flow of Waterworks Springs as 350,000 gallons per day (about 240 gpm). Later in Meinzer's report (1917, p. 153) he also reports the flow as 500+ gpm. If the smaller figure is correct, the average annual flow of these springs probably is about 400 acre-feet. The springs are in part utilized by the public-supply system at Silver Peak, but most of the water is consumed by phreatophytes in a nearby swampy, saltgrass area. This discharge is included in the estimates of evapotranspiration in table 8. The net consumption of spring flow by the public-supply system probably is about 10 acre-feet per year.

In Alkali Spring Valley, Alkali Spring (1S/41-26a) flows about 50 gpm at 140° F. The spring flows into a small stockwatering pond. Some of the water is consumed by stock, some is evapotranspired (the loss is accounted for in table 8), but most percolates back into the ground and recharges the ground-water reservoir. The stock consumption and associated losses from ponded water are estimated to be no greater than 10 acre-feet per year.

In Lida Valley, Meinzer (1917, p. 151) described several springs near Lida. Their flow was piped 30 miles northeast to Goldfield where it was used as the public supply and for milling. The dependable supply from these springs was reported to be about 450 acre-feet per year. After 1919, the pipe line was not operated again. A very brief inspection of a few of these springs indicates that their flow is now only a fraction of the flow reported by Meinzer. Most of the flow seeps back into the ground and percolates to the water table; some supports small areas of phreatophytes. The few residents of Lida use spring 5S/40-36a (table 15) for domestic supply, probably consuming less than 10 acre-feet per year.

In Grapevine Canyon, about a mile northeast of Scottys Castle, Stainingers Springs (11S/43-6b) had a flow of about 200 gpm in the spring of 1967, or about 300 acre-feet per year. Ball (1907, p. 20) described the springs as having a flow of about 600,000 gallons per day (about 700 acre-feet per year). In addition several small springs and seeps, called Grapevine Springs (Mendenhall, 1909, p. 31), 11S/42-3a,b, are about 3 miles west of Scottys Castle. The combined flow of these springs is not known, but is probably only a fraction of the flow of Stainingers Springs, or perhaps 100 acre-feet per year. These two groups of springs probably drain Grapevine Canyon and perhaps some additional adjoining areas. Perhaps 10 acre-feet of springflow per year is utilized at Scottys Castle, some is discharged by a few acres of phreatophytes near and downstream from the springs, but most seeps back to the water table where it flows in the subsurface to Death Valley.

Subsurface Outflow

Subsurface outflow through consolidated rocks and (or) alluvium occurs from Lida Valley to Sarcobatus Flat and from Oriental Wash and Grapevine Canyon to Death Valley. Outflow also occurs from Alkali Spring Valley to Clayton Valley (previously described as subsurface inflow of 5,000 acre-feet per year to Clayton Valley) and from Stonewall Flat to Lida Valley (previously described as subsurface inflow of 200 acre-feet per year to Lida Valley). Because of virtually no surficial natural discharge from Lida Valley, Stonewall Flat, and Oriental Wash, subsurface outflow probably is the principal means of discharge.

For Lida Valley, because of no phreatophyte discharge in the valley and because of water-table gradients all recharge is assumed to be discharged as subsurface outflow to Sarcobatus Flat. The estimated average annual recharge consists of 500 acre-feet from precipitation (table 5) and 200 acre-feet of underflow from Stonewall Flat, or a total of 700 acre-feet. Malmberg and Eakin (1962, p. 16) indicate that as much as 2,300 acre-feet of recharge to Sarcobatus Flat may be derived by subsurface inflow from tributary valleys. The conclusion reached in this reconnaissance is that about 700 acre-feet of inflow is supplied from Lida Valley. In addition, the possibility exists for some ground-water flow from Ralston and Stonecabin Valleys through Stonewall Flat to Sarcobatus Valley (fig. 3). Future studies may help refine the flow net and quantities of flow involved.

GROUND-WATER BUDGETS

For natural conditions and over the long-term, assuming that long-term climatic conditions remain reasonably constant, ground-water inflow to and outflow from an area are about equal. Thus, a ground-water budget can be used (1) to compare the estimates of natural inflow to and outflow from each valley, (2) to determine the magnitude of errors in the two estimates, provided that one or more elements are not estimated by difference, and (3) to select a value that, within the limits of accuracy of this reconnaissance, represents both inflow and outflow. This value in turn is utilized in a following section of the report to estimate the perennial yield of each area. Table 10 presents water budgets for each area and shows the reconnaissance value selected to represent both inflow and outflow.

For Clayton Valley, because neither the inflow figure nor outflow figure is considered more accurate, the average of the two is used for the value to represent both inflow and outflow. For Stonewall Flat, the inflow value is selected as probably being the more accurate of the two and for Grapevine Canyon, the outflow is selected for the same reason.

Table 10.--Preliminary ground-water budgets

[All estimates in acre-feet per year and rounded]

Budget elements	Clayton Valley	Alkali Spring Valley	Lida Valley	Stonewall Flat	Oriental Wash	Grapevine Canyon
INFLOW:						
Ground-water recharge from precipitation (table 5)	1,500	100	500	100	300	50
Subsurface inflow (p. 24-27)	18,000	5,500	200	--	--	500
Total (rounded) (1)	20,000	5,500	700	100	300	500
NATURAL OUTFLOW:						
Evapotranspiration (table 8)	24,000	400	minor	--	--	minor
Springs (p. 31-32)	a 10	minor	10	--	--	a 10
Subsurface outflow (p. 32-33)	0	b 5,000	b 700	200	b 300	400
Total (rounded) (2)	24,000	5,500	700	200	300	400
IMBALANCE:						
Excess of outflow over inflow (2) - (1)	4,000	(c)	(c)	100	(c)	-100
VALUES SELECTED TO REPRESENT INFLOW AND NATURAL OUTFLOW	22,000	5,500	700	100	300	400

a. Most of the spring discharge is included in evapotranspiration estimate or as subsurface outflow.

b. Computed to be the difference between total recharge minus the estimated elements of discharge.

c. Imbalance is 0 because some elements of budget were determined by difference.

CHEMICAL QUALITY OF WATER

As part of the present study, 16 water samples were analyzed in a field-office laboratory to make a general appraisal of the suitability of the water for domestic and agricultural use and to define the general chemical quality of the water. The analyses are listed in table 11.

The samples were analyzed for the principal anions and cations, except sodium and potassium, which were computed by difference. Fluoride, iron, manganese, arsenic and nitrate were not determined, although they are important ions and affect the suitability of water for domestic use. Boron, critical to agricultural use, was not determined.

For agricultural use the ground water analyzed was fair to poor in quality, as classified by the Salinity Laboratory (U.S. Dept. Agriculture, 1954) (table 11). For drinking purposes, most of the water samples are marginal as to quality. Most samples had undesirable concentrations of chloride, exceeding 250 ppm (parts per million), sulfate (more than 250 ppm), or total dissolved solids, as reflected by specific conductance of more than about 750 micromhos (U.S. Public Health Service, 1962). The sample from the Goldfield supply system had a specific conductance of 702 micromhos which is within the recommended limits. The water used for public supply at Silver Peak is highly mineralized (spring 2S/39-22a, table 11).

Because only a small number of wells and springs could be sampled, conclusions as to the general quality of water should not be drawn from the data in table 11. Both better quality and poorer quality water probably occurs in the valleys.

In areas of evapotranspiration the mineral content of water generally is high, as in Clayton Valley. This is not the case, however, in Alkali Spring Valley. Water from well 1S/41-4c on the playa, which is surrounded by greasewood that is transpiring ground water, had a specific conductance of only 1,730 micromhos, compared to a water sample from well 2S/40-17a on the playa in Clayton Valley, which had a specific conductance of 242,000 micromhos. A conductance of 1,730 micromhos suggests a mineral content of about 1,000 ppm. Generally, this would be a low concentration, if this were the principal area of natural discharge. The low mineral content confirms the preliminary conclusion that subsurface flow is occurring through the valley (fig. 3),

that flushes the dissolved-mineral matter westward to Clayton Valley rather than allowing it to accumulate and concentrate in Alkali Spring Valley.

Table 11.--Chemical analyses of water from selected sources

[Field-office analyses by the U.S. Geological Survey]

Location	Date of collection	Source type	Temperature (°F)	Parts per million (upper number) equivalents per million (lower number): Calcium (Ca)	Magnesium (Mg)	Sodium (Na) plus Potassium (K)	Bicarbonate (HCO_3)	Chloride (Cl)	Sulfate (SO_4)	Hardness as $CaCO_3$: Calcium, magnesium	Sodium carbonate	Specific conductance (micromhos at 25°C)	pH	Some factors affecting irrigation quality[1]: Salinity hazard	Alkalinity hazard	SSC	Water type	Rock source
CLAYTON VALLEY																		
1S/40-25a(?)	1-19-67	Spring	98	--	--	--	--	--	--	--	--	39,300	--	Very high	--	--	--	Siltstone(?)
2S/39-22a	1-19-67	Waterworks Spring	64	a154	a59	a140	a207	a774	a55	--	--	2,820	--	Very high	--	--	--	Limestone
2S/40-17a	1-19-67	Well	--	--	--	--	--	--	--	--	--	242,000	--	Very high	--	--	--	Alluvium
3S/39-11a	1-19-67	Well	--	--	--	--	--	--	--	--	--	2,650	--	Very high	--	--	--	Alluvium
ALKALI SPRING VALLEY																		
1N/41-26a	10-21-13	Well	--	a 17 0.85	a 9 0.74	a125 5.43	a212 3.48	a 44 1.24	a120 2.50	--	--	--	--	(b)	(c)	Marginal	Mixed	Alluvium
1N/42-34c	1-18-67	Well	59	16 0.80	5.6 0.46	78 3.41	166 2.72	24 0.68	61 1.27	63	0	459	8.2	Medium	Low	Marginal	Sodium bicarbonate	Alluvium
1S/41-4c	1-19-67	Well	55	--	--	--	--	--	--	--	--	1,730	--	High	--	--	--	Alluvium
1S/41-26a	1-18-67	Alkali Spring	140	46 2.30	4.6 0.38	349 15.2	348 5.70	68 1.92	492 10.2	134	0	3,840	8.1	High	High	Not suitable	Sodium sulfate	Volcanic rock
3S/42-11b	1-19-67	Well	59	--	--	--	--	--	--	--	--	702	--	Medium	--	--	--	Alluvium(?)
LIDA VALLEY																		
4S/43-33a	1-18-67	Well	64	--	--	--	--	--	--	--	--	806	--	High	--	--	--	Alluvium
5S/40-36a	1-15-67	Carter Spring	--	58	28	34	261	40	61	261	47	585	8.1	Medium	Low	Safe	Calcium magnesium	--
5S/40-36c	1-22-67	Well	--	178 8.88	81 6.70	46 1.98	234 3.84	277 7.81	284 5.91	780	588	1,780	8.0	High	Low	Safe	Mixed	Alluvium
5S/43-17c	1-18-67	Well	--	41 2.05	24 1.99	99 4.30	222 3.64	.28 0.79	185 3.91	202	20	773	8.0	High	Low	Safe	Mixed	Alluvium
STONEWALL FLAT																		
2S/43-36c	1-19-67	Willow Spring	--	--	--	--	--	--	--	--	--	418	--	Medium	--	--	--	Consolidated rock
5S/44-5b	1-18-67	Stonewall Spring	68	--	--	--	--	--	--	--	--	282	--	Medium	--	--	--	Consolidated rock
GRAPEVINE CANYON																		
8S/43-32b	1-18-67	Well	64	--	--	--	--	--	--	--	--	771	--	High	--	--	--	Alluvium
11S/43-6b	1-20-67	Steiningers Spring	77	9.6 0.48	2.4 0.20	149 6.47	238 3.90	47 1.33	92 1.92	34	0	734	8.1	Medium	Medium	Not suitable	Sodium bicarbonate	Alluvium

1. Descriptive terms are for water applied to good soils requiring little or no leaching and having favorable drainage characteristics.

a. From Meinzer (1917, p. 154).

b. Probably high.

c. Probably medium.

THE AVAILABLE WATER SUPPLY

Sources of Supply

The available ground-water supply of the six valleys in the Clayton Valley-Stonewall Flat area consists of two interrelated entities: (1) the perennial yield, or the maximum amount of natural discharge that economically can be salvaged over the long term by pumping; and (2) the transitional storage reserve (defined below).

Perennial Yield

The perennial yield of each of the six valleys is shown in table 12. In Clayton and Alkali Spring Valleys, most of the ground-water evapotranspiration could be salvaged by properly located wells in or near the areas of discharge. However, in Clayton Valley water quality might be a limiting factor for agricultural use.

In Alkali Spring and Lida Valleys, Stonewall Flat, and Oriental Wash, from which subsurface outflow is the dominant means of discharge, the amount of salvable discharge is difficult to determine. The possibility of salvaging all or part of the outflow by pumping is uncertain. For the purposes of this reconnaissance it is assumed that the subsurface geohydrologic controls might permit salvage of about half the outflow by partly dewatering the valley-fill reservoir. In Grapevine Canyon, nearly all the natural discharge, that is, all the flow of Grapevine and Stainingers Springs can be salvaged.

Transitional Storage Reserve

Transitional storage reserve has been defined by Worts (1967) as the quantity of water in storage in a particular ground-water reservoir that can be extracted and beneficially used during the transition period between natural equilibrium conditions and new equilibrium conditions under the perennial-yield concept of ground-water development. In the arid environment of the Great Basin, the transitional storage reserve of such a reservoir is the amount of stored water available for withdrawal by pumping during the nonequilibrium period of development, or period of lowering water levels. Therefore, transitional storage reserve is a specific part of the total ground-water resource that can be taken from storage; it is water that is available in addition to the recharge.

Table 12.--Estimated perennial yield

Valley	Perennial yield[1] (acre-feet)	Remarks
Clayton Valley	22,000	Assumes salvage of nearly all natural discharge. Water quality poor, but suitable for mineral extraction.
Alkali Spring Valley	3,000	Assumes salvage of evapotranspiration losses and about half the subsurface outflow.
Lida Valley	350	Assumes salvage of about half the subsurface outflow.
Stonewall Flat	100	Do.
Oriental Wash	150	Do.
Grapevine Canyon	400	Assumes salvage of all the flow of Grapevine and Stainingers Springs, which mostly becomes subsurface outflow.

1. Salvable supply based on estimates in table 10.

Most pertinent is the fact that no ground-water source can be developed without causing storage depletion. The magnitude of depletion varies directly with the distance of development from any recharge and discharge boundaries in the ground-water system. Few desert valleys have well-defined recharge boundaries, such as live streams or lakes; many, however, have well-defined discharge boundaries, such as areas of evapotranspiration.

To compute the transitional storage reserve of the six valleys in the report area, several assumptions are made: (1) wells would be strategically situated in, near, and around the areas of natural discharge so that these natural losses (subsurface outflow and evapotranspiration) could be reduced or stopped with a minimum of water-level drawdown in pumped wells; (2) a perennial water level 50 feet below land surface would curtail virtually all evapotranspiration losses from ground water; (3) over the long term, pumping would cause a moderately uniform depletion of storage throughout most of the valley fill, except in playa deposits (mostly clay) where the transmissibility and storage coefficients are small; (4) the specific yield of the valley fill is 10 percent; (5) the water levels are within the range of economic pumping lift for the intended use; (6) the development would have little or no effect on adjacent valleys or areas; and (7) the water is of suitable chemical quality for the intended use.

Table 13 presents the preliminary estimates of transitional storage reserve, based on the above assumptions. For each of the six valleys the estimated storage reserve is the product of the area beneath which depletion can be expected to occur, average thickness of the valley fill to be dewatered, and specific yield.

The manner in which transitional storage reserve augments the perennial yield has been described by Worts (1967) and in its simplified form is shown by the following equation:

$$Q = \frac{\text{Transitional storage reserve}}{t} + \frac{\text{Perennial yield}}{2}$$

in which Q is the pumping rate, in acre-feet per year, and t is the time, in years, to exhaust the transitional storage reserve. This basic equation, of course, could be modified to allow for changing rates of storage depletion and salvage of natural discharge. The equation, however, is not valid for pumping rates less than the perennial yield.

Table 13.--Preliminary estimates of transitional storage reserve

[All quantities rounded]

Valley	Area of depletion (acres) (1)	Thickness to be dewatered (feet) (2)	Transitional storage reserve 1/ (acre-feet) (1) x (2) x 0.10
Clayton Valley	a 90,000	50	b 450,000
Alkali Spring Valley	80,000	c 10	80,000
Lida Valley	d 120,000	50	600,000
Stonewall Flat	70,000	50	350,000
Oriental Wash	35,000	50	180,000
Grapevine Canyon	--	0	e

1. Assumes a specific yield of 10 percent.

a. Excludes alluvial areas in Weepah Hills and Paymaster Canyon and those isolated areas mostly in the eastern halves of T. 2 S., R. 40 E., and T. 3 S., R. 40 E., and southwestern part of T. 2 S., R. 41 E.

b. Excludes playa deposits now being pumped for mineral extraction.

c. Water level in 1967 about 40 feet in phreatophyte areas (table 8).

d. Excludes the alluvial area between Goldfield Hills and Mount Jackson Ridge.

e. No mining of ground water is necessary to salvage most of the natural discharge of the area (Grapevine and Stainingers Springs).

Using the above equation and the estimates for Clayton Valley as an example (transitional storage reserve 450,000 acre-feet, table 13; perennial yield 22,000 acre-feet, table 12) and using a pumping rate (Q) equal to perennial yield in accordance with the general intent of Nevada Water Law, the time (t) to deplete the transitional storage reserve is computed to be 40 years. At the end of that time, the transitional storage reserve would be exhausted, subject to the assumptions previously described.

What is not shown by the example is that in the first year virtually all the pumpage would be derived from storage, and very little, if any, would be derived by salvage of natural discharge. On the other hand, during the last year of the period, nearly all pumpage would be derived from the salvage of natural discharge and virtually none from the storage reserve.

During the period of depletion the ground-water flow net would be substantially modified. The estimated recharge of 22,000 acre-feet per year that originally flowed from around the sides of the valley to areas of natural discharge would ultimately flow directly to pumping wells.

To meet the needs of an emergency or other special purpose requiring ground-water pumpage in excess of perennial yield for specified periods of time, the transitional storage reserve would be depleted at a more rapid rate than in the example given. The above equation can be used to compute the time required to exhaust the storage reserve for any selected pumping rate in excess of the perennial yield. However, once the transitional storage reserve was exhausted, the pumping rate should be reduced to the perennial yield as soon as possible. Pumpage in excess of the perennial yield would result in an overdraft, and pumping lifts would continue to increase and stored water would continue to be depleted until some undesired result occurred.

FUTURE DEVELOPMENT

The only significant water development in the area in 1966 was in Clayton Valley where about 2,000 acre-feet was evaporated for mineral extraction (table 9). This leaves an estimated 20,000 acre-feet per year of salvable water to be consumed for industrial and agricultural use, if water of suitable quality exists in areas favorable for farming. The low altitude of Clayton Valley favors a longer growing season than the higher, adjoining valleys. The best area, hydrologically, for development of the ground-water resources probably is in T. 3 S., R. 39 E., because of its proximity to the largest phreatophyte-discharge area and because of its shallow-to-moderate depths to water. Because the scope of this study excluded test drilling, the hydrologic evaluation of this area is tentative. Before any large-scale development is undertaken, test drilling should be done to evaluate the aquifer characteristics, depth to water, and particularly the water quality for the intended use. An evaluation of soil suitability also is beyond the scope of this study.

Alkali Spring Valley, having a yield of possibly 3,000 acre-feet per year, contains water that might be suitable for irrigation. However, static water levels are no less than 30 feet and might be 50 feet or more in areas having soils suitable for farming. Whether large-capacity wells could be developed is not known.

The depths to water in 1966 in Lida Valley, Stonewall Flat, and Oriental Wash probably were in excess of 200 feet. Ground water in these areas probably would be economically developed only for some industrial uses or for public-supply inasmuch as pumping lifts would exceed present economic limits for most types of agriculture. Moreover, the estimated perennial yields are inadequate (100-350 acre-feet) for any significant farming development.

The springs near Lida in Lida Valley probably could be redeveloped as they were when their flow was piped to Goldfield (Meinzer, 1917, p. 151). To determine their present potential, each spring would have to be visited, the flow measured, the quality of the water determined, and development costs ascertained. In Grapevine Canyon, maximum development of Grapevine and Stainingers Springs would utilize most of the perennial yield of the area.

Table 14.--Selected well data

Use: M, mining; S, stock; T, test; P, public supply;
D, domestic; U, unused; O, observation

Location number	Owner or name	Year drilled	Depth (feet)	Diameter (inches)	Use	Yield (gpm) and drawdown (feet)	Land surface altitude (feet)	Water-level measurement		State log number	Remarks
								Date	Depth (feet)		
						CLAYTON VALLEY					
2S/39-12c	Foote Mineral Company	1966	500	12	M	--	4,450	5-30-66	8	9001	
-14b	Do.	1965	125	6	M	--	4,290	2- 3-65	18	8364	
-15d	Do.	1965	50	6	M	--	--	2- 5-65	14	8365	
-25b	Do.	1966	400	6	T	--	--	5-28-66	2	9000	
2S/40-18da	Do.	1964	700	10	M	600/296	4,267	3-26-64	4	8334	
-18db	Do.	1964	500	10	M	800/296	4,267	6-19-64	4	8333	
3S/39-11a	Do.	1965	1,820	12	M	--	4,280	5-28-65	4	8529	
-16c	--	--	--	--	S	--	4,325	1-19-67	44.75	--	
-35cc	--	--	--	--	S	--	4,396	1-19-67	117.80	--	
4S/38-10d	Fish Lake Livestock Co.	1958	185	--	S	--	5,241	1958	dry	4520	
-11a	Do.	1958	245	6	S	15/--	5,000	12- 9-58	215	4518	
						ALKALI SPRING VALLEY					
1N/41-26a	Gottschalk Well	--	--	--	-	--	--	10-21-13	61	--	(a)
1N/42-34c	Klondike	--	160	50x70	S	--	4,940	10-22-13	148	--	(a)
								1-18-67	138.01	--	
1S/41-4c	U.S.G.S., no. 3	1965	72	1½	O	--	4,825	1-19-67	45.70	--	First water at 67 feet.
-18a	U.S.G.S., no. 2	1965	72	1½	O	--	4,825	1-19-67	47.62	--	(b)
1S/42-10a	Dodge Construction Co., Ramsey Well	1950	310	6	S	300/--	4,990	5-29-50	210	1345	(c)
								2-15-58	197.40		
								10-11-62	197.45		

Table 15.--Selected spring data

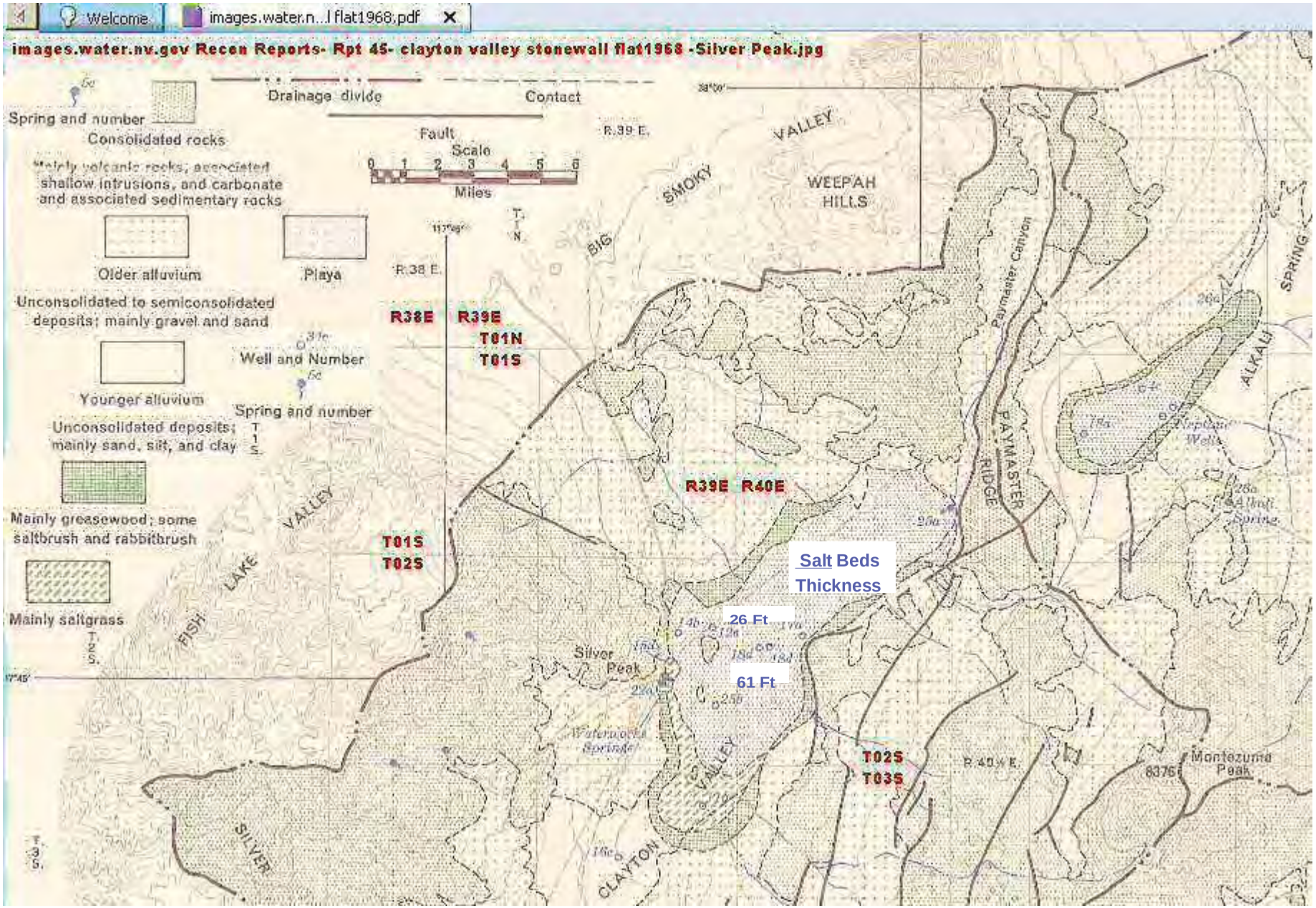
Use: P, public supply; U, unused; S, stock; D, domestic; I, Irrigation

Location number	Owner or name	Altitude (feet)	Rock type	Yield (gpm)	Use	Remarks
			CLAYTON VALLEY			
1S/40-25a(?)	--	4,350	Siltstone	<25	U	Two springs; discharge at edge of playa
2S/39-22a	Waterworks Springs	4,280	Limestone	240	P	Yield as reported by Meinzer (1917, p. 143) and Dole (1912, p. 5) Temperature of water ranges from 70° to 120°F
			ALKALI SPRING VALLEY			
1S/41-26a	Alkali Spring	5,020	Volcanic rock	40	S	Hot water; was piped to Goldfield for milling
			LIDA VALLEY			
5S/40-36a	Carter Spring	6,400	--	30	D,S	
6S/40-22d	Stateline Spring	6,960	Limestone	--	S	Was piped to Stateline Mill (7S/41-26b)
(near Lida)	Lida spring supply	--	--	300±	--	Used at Goldfield until 1919, Meinzer (1917, p. 151)
			STONEWALL FLAT			
2S/43-36c	Willow Spring	5,950	Consolidated rock	<1	S	
5S/44-5b	Stonewall Spring	5,800	do.	10	S	
			ORIENTAL WASH			
9S/41-7b	Sand Spring	3,140	Alluvium	1	S	In Death Valley
9S/41-18a	Little Sand Spring	3,020	do.	<1	S	In Death Valley
			GRAPEVINE CANYON			
11S/43-6b	Staininger Springs	3,200	Alluvium	200	D,I	Water used at Scottys Castle, 1 mile west. Waring (1915, p. 375) estimates the flow as 10 gpm. Ball (1907, p. 20) estimates the flow as about 600,000 gpd (400 gpm)
11S/42-3a,d	Grapevine Springs	2,800	Consolidated rock	>20	--	Located 3 miles west of Scottys Castle

See "Salt Layers"

Table 16.--Selected drillers' logs of wells

Material	Thickness (feet)	Depth (feet)
CLAYTON VALLEY		
2S/39-12c		
Clay, brown	14	14
Salt, layers	14	28
Mud, blue, and chunks of salt	30	58
Salt, firm	6	64
Clay, blue, with sand streaks	16	80
Salt	2	82
Clay, blue	44	126
Salt	4	130
Clay, blue, firm	82	212
Sand	14	226
Gypsum-like material, hard	18	244
Clay, hard	4	248
Sand	20	268
Clay, sandy, blue, soft	38	306
Clay, blue, hard	22	328
Sand	14	342
Clay, blue	48	390
Sand	6	396
Clay, blue	22	418
Sand	24	442
Clay, blue	18	460
Gypsum-like material, hard	15	475
Clay, blue, with sand streaks	25	500
2S/39-25b		
Clay, brown, wet	12	12
Clay, brown, hard	12	24
Clay, gray, soft	36	60
Sand	4	64
Clay, gray, hard	16	80
Sand, fine	3	83
Clay, gray, and gravel	37	120
Sand	3	123
Clay, gray, and rock	117	240
Sand, fine	6	246
Clay, gray, and gravel	44	290
Rock	12	302
Clay, gray, with sand streaks	32	334
Rock and shale	66	400
2S/40-18da		
Clay, brown	12	12
Salt	13	25
Sand, hard	30	55
Salt, hard	2	57
Clay, sandy, blue, hard	21	78
Clay, soft	4	82
Salt, crystalline	14	96
Clay, dark brown, sticky	9	105
Rock, loose; some gypsum	17	122
Salt	32	154
Clay, brown, sticky	132	286
Sand, blue, fine, with some pumice	12	298
Clay, brown, soft	32	330
Sand, blue, fine	8	338
Clay, brown	47	385
Rock and gypsum, hard	15	400
Sand, soft, with pumice	32	432
Clay, brown, soft	73	505
Gravelly clay, brown, hard	10	515
Gravel and sand	19	534
Clay, gravelly, gray, soft	36	570
Clay, gray, hard	14	584
Rock and gypsum	10	594
Sand, gravelly	6	600
Rock and gypsum	25	625
Clay and shale	75	700


Welcome
images.water.n...l flat1968.pdf
images.water.nv.gov Recon Reports- Rpt 45- clayton valley stonewall flat1968 -Silver Peak.jpg
Spring and number
Drainage divide
Contact
Consolidated rocks
Fault
Scale
0 1 2 3 4 5 6
Miles
Mainly volcanic rocks, associated shallow intrusions, and carbonate and associated sedimentary rocks
Older alluvium
Playa
Unconsolidated to semiconsolidated deposits; mainly gravel and sand
Well and Number
Younger alluvium
Spring and number
Unconsolidated deposits; mainly sand, silt, and clay
Mainly greasewood; some saltbrush and rabbitbrush
Mainly saltgrass
R.39 E.
R.38 E.
R38E
R39E
R40E
T01N
T01S
T02S
T03S
VALLEY
SMOKY
WEEPAH HILLS
BIG
Paymaster Canyon
PAYMASTER RIDGE
ALKALI
SPRING
FISH LAKE
Silver Peak
Waterspout Spring
CLAYTON
SILVER
Montezuma Peak
8376
Salt Beds Thickness
26 Ft
61 Ft

Silver Peak Area Geothermal Exploration Project
Environmental Assessment
DOI-BLM-NV-B020-012-0214-EA
DOE/EA-1921

Appendix C

Responses to Comments

A-1: Given the additional expense related to pitless drilling, and the associated scheduling delays which would result from implementing pitless drilling procedures at this stage, it is not feasible at this time. To the extent practicable, fluids from drilling and testing will be contained in the 500 bbl Baker tanks. No change in the EA has been made in response to this comment.

A-2: Information has been added to EA Section 2.1.8.3 (Wildlife Protections), indicating that monitoring and bird deterrence practices to be used at the reserve pits would also be applied to Pond 17W.

A-3: Given ongoing short and long term flow testing procedures it may not be feasible to close a reserve pit 30 days upon release of the drill rig. The reserve pits will remain open for the minimum amount of time practicable. Wildlife protection measures (see Section 2.1.8.3) will be adhered to throughout the life of the Project, and the Project will be conditioned accordingly. No change to the EA has been made in response to this comment.

B-1: An emission estimate was added to the EA Section 4.1.1 (Air Quality).

B-2: Information about the Rockwood “expansion project” and its status has been added to the EA Section 5.2 (Past and Present Actions). The DOE EA has also been added to EA Section 7 (References). Reference to the expansion activities has also been added to the EA Section 5.4.1 (Air Quality) and Section 5.4.4 (Hazardous Materials and Wastes).

C-1: To protect dark skies from light pollution, mitigation measures have been specified for the Proposed Action. These measures, including limiting, shielding, and directing project lighting, are described in EA Section 6. No change to the EA has been made in response to this comment.

C-2: The Proposed Action would be sited entirely within a previously disturbed area, and no new roads would be constructed. A project mitigation measure (EA Section 6) specifies that wellhead equipment remaining on the drill site would be painted a color compatible with the landscape. No change to the EA has been made in response to this comment.

D-1: The 1988 study by Cyprus Foote Mineral Co. used two methods to determine the life of the freshwater aquifer. Using the volumetric analysis and correcting for recharge, the life expectancy of the aquifer was determined to be approximately 27 years. The study assumed that brine water existed at an elevation of 4200 ft. above mean sea level (amsl). Potable water was found at 3980 ft. amsl (Jennings, 2010). The study used pumping rates of 500 acre-feet annually

(AFA) for Chemetal Foote and 300 AFA for the Town of Silver peak. The 300 AFA for Silver Peak does not reflect the actual amount of water pumped. Water usage for the Town of Silver Peak for 2007 was 17.2 million gallons or 53 acre-feet (Boland, 1998). Using the volumetric method described in the 1998 study and adjusting the elevation of brine water to a conservative elevation of 4000 ft. amsl, the volume of fresh water in the aquifer increases from 11,520 acre-feet to approximately 59,200 acre-feet. The life of the freshwater aquifer increases from 27 years to approximately 150 years when annual pumping rates are held constant at 560 acre-feet.

The total estimated water required for the proposed action is 21 – 42 acre-feet. The pumping of this amount of water would have a minimal impact on the freshwater aquifer and does not represent 2 years of the potable water resources of the Town of Silver Peak. No change to the EA has been made in response to this comment.

Boland, N., J., Silver Peak Well Replacement Project, August 2008

Cypress Foote Mineral Company, Groundwater Supply Assessment of the Fresh Water Aquifer Clayton Valley, Nevada, Esmeralda, September 2, 1998

Jennings, M. Re-analysis of Groundwater Supply Fresh Water Aquifer of Clayton Valley, Nevada, 2010

D-2: BLM does not generally supply a copy of all referenced materials along with an environmental analysis document; doing so would exponentially increase the size and costs of providing these documents for public review. BLM does keep these resources available for interested parties who wish to see a copy. A copy of the Jennings (2010) report was sent via email to Mr. Rupp on November 1, 2012. No change to the EA has been made in response to this comment.

D-3: The Silver Peak Area Geothermal Exploration Project pertains to construction of geothermal well pads and the drilling of exploration wells. Power generation and power generation turbines are not activities associated with this exploration project, and as such, were not analyzed in this EA. The volume of geothermal fluid expected to flow during the short and long term testing of the geothermal wells, and the handling of such fluid during those testing periods, is discussed in EA Sections 2.1.3.1 and 2.1.3.2, respectively. No change to the EA has been made in response to this comment.

D-4: It is assumed that this comment concerns water quality and not quantity. The geothermal wells would be completed in the brine aquifer beneath the playa at depths between 6,000 and 10,000 feet. The brine aquifer is not a source of drinking water. Water quality samples have shown TDS (total dissolved solids) levels of approximately 59,000 mg/L. An underground source of drinking water (USDW) is defined as any groundwater containing 10,000 mg/L or less of TDS. The geothermal fluid from the tests would be extracted and injected at these depths using cased wells and would not impact the freshwater aquifer which supplies the Town of Silver Peak. No change to the EA has been made in response to this comment.

D-5: No power generation is proposed under the Silver Peak Area Geothermal Exploration Project. See also the response to comment D-3. No change to the EA has been made in response to this comment.

D-6: Formal public scoping is required when an agency prepares an Environmental Impact Statement – see 40 C.F.R. § 1501.7. CEQ regulations do not require a formal external scoping meeting or hearing when preparing an Environmental Assessment. BLM did, however, conduct internal interdisciplinary scoping to define the issues to be analyzed in the EA. No change to the EA has been made in response to this comment.

D-7: The 2008 Boland report, *Silver Peak Well Replacement*, contains no information supporting the statement, "…that as of 2008, saline waters have encroached into the freshwater aquifer resulting in unknown levels and classes of pollution into Silver Peak's Municipal Water System." The 2008 report identifies the intrusion of the brine aquifer as a **potential contaminate source**.

The Town of Silver Peak constructed a new well, Silver Peak System Well #2, in March of 2003. The water from the new well exceeded standards for fluoride, uranium and Gross Alpha. A letter from K. Swanson (Farr West Engineering, Reno, NV), Appendix I of the 2008 report, to Nancy Boland, Esmeralda County Commissioner, dated December 20, 2007 stated, "The occurrence of poorer groundwater in the well was the result of completing the perforated portion of the well in the volcanic rock beneath the alluvium." The 2008 report states that customers complained of skin problems and dying vegetation. The report also states that when the new well was taken off line, customers notified the operator that water quality had improved.

A search of violations for the Silver Peak Water System produced the following information.

Violation No.	Status	Violation Type	Violation Name	Analyte Code	Analyte Name	Water System Facility State Asgn ID	Water System Facility Name
2007-1003307	V	02	MCL, AVERAGE	4006	COMBINED URANIUM	W02	WELL 3 BACKUP INACTIVE
2005-1002605	V	52	FOLLOW-UP OR ROUTINE TAP M/R (LCR)	5000	LEAD & COPPER RULE		
2001-1000901	V	52	FOLLOW-UP OR ROUTINE TAP M/R (LCR)	5000	LEAD & COPPER RULE		
2001-18001	V	51	INITIAL TAP SAMPLING (LCR)	5000	LEAD & COPPER RULE		
2001-34801	V	51	INITIAL TAP SAMPLING (LCR)	5000	LEAD & COPPER RULE		

Violation No.	Status	Violation Type	Violation Name	Analyte Code	Analyte Name	Water System Facility State Asgn ID	Water System Facility Name
2000-1000000	V	26	MONITORING (TCR), REPEAT MINOR	3100	COLIFORM (TCR)		
2000-100	V	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)		
1998-1000898	V	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)		
1994-494	V	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)		
1992-192	V	23	MONITORING (TCR), ROUTINE MAJOR	3100	COLIFORM (TCR)		
1988-10088	V	02	MCL, AVERAGE	3000	COLIFORM (PRE-TCR)		
1986-11786	V	03	MONITORING, ROUTINE MAJOR	3000	COLIFORM (PRE-TCR)		
1986-2186	V	02	MCL, AVERAGE	3000	COLIFORM (PRE-TCR)		
1982-22382	V	03	MONITORING, ROUTINE MAJOR	3000	COLIFORM (PRE-TCR)		
1981-30681	V	01	MCL, SINGLE SAMPLE	3000	COLIFORM (PRE-TCR)		
1981-28381	V	03	MONITORING, ROUTINE MAJOR	3000	COLIFORM (PRE-TCR)		
1980-17580	V	03	MONITORING, ROUTINE MINOR	3000	COLIFORM (PRE-TCR)		

https://ndwis.ndep.nv.gov/DWW/JSP/Violations.jsp?tinwsys_is_number=296130&tinwsys_st_code=NV

These violations would not be a result of the encroachment of saline waters into the freshwater aquifer.

The following table reports non-coliform sample results.

Water System No. : NV0000363 **Federal Type :** C

Alternate State No. :
Water System Name : SILVER PEAK WATER SYSTEM
Principal County Served : ESMERALDA
Status : A
Lab Sample No. : S201009-0376

State Type : C
Primary Source : GW
Activity Date : 01-01-1980

Collection Date : 09-07-2010

Analyte Code	Analyte Name	Method Code	Less than Indicator	Level Type	Reporting Level	Concentration level	Monitoring Period Begin Date	Monitoring Period End Date	MCL
1002	ALUMINUM	200.7	Y	MRL	.05 MG/L		01-01-2008	12-31-2010	200.0 UG/L
1005	ARSENIC	200.8	N	MRL	0 MG/L	2.0 UG/L	01-01-2008	12-31-2010	10.0 UG/L
1017	CHLORIDE	300.0	N	MRL	0 MG/L	159000.0 UG/L	01-01-2008	12-31-2010	400000.0 UG/L
1022	COPPER, FREE	200.8	N	MRL	0 MG/L	5.0 UG/L	01-01-2008	12-31-2010	1000.0 UG/L
1025	FLUORIDE	300.0	N	MRL	0 MG/L	700.0 UG/L	01-01-2008	12-31-2010	2000.0 UG/L
1028	IRON	200.7	Y	MRL	.05 MG/L		01-01-2008	12-31-2010	600.0 UG/L
1031	MAGNESIUM	200.7	N	MRL	0	27000.0 UG/L	01-01-2008	12-31-2010	150000.0 UG/L
1032	MANGANESE	200.8	Y	MRL	.001 MG/L		01-01-2008	12-31-2010	100.0 UG/L
1038	NITRATE-NITRITE	300.0	N	MRL	0 MG/L	740.0 UG/L			10000.0 UG/L
1040	NITRATE	300.0	N	MRL	0 MG/L	740.0 UG/L	01-01-2010	12-31-2010	10000.0 UG/L
1041	NITRITE	300.0	Y	MRL	.05 MG/L		01-01-2008	12-31-2010	1000.0 UG/L
1050	SILVER	200.8	Y	MRL	.001 MG/L		01-01-2008	12-31-2010	100.0 UG/L
1052	SODIUM	200.7	N	MRL	0 MG/L	89000.0 UG/L	01-01-2008	12-31-2010	200000.0 UG/L
1055	SULFATE	300.0	N	MRL	0 MG/L	200000.0 UG/L	01-01-2008	12-31-2010	500000.0 UG/L
1089	MBAS - FOAMING AGENTS (SURFACTANTS)	5540C	Y	MRL	.05 MG/L		01-01-2008	12-31-2010	500.0 UG/L
1095	ZINC	200.8	N	MRL	0 MG/L	40.0 UG/L	01-01-2008	12-31-2010	5000.0 UG/L
1905	COLOR	2120B	Y	MRL	5 CU		01-01-2008	12-31-2010	15.0 CU
1920	ODOR	2150 B	N	MRL	0 MG/L	0 TON	01-01-2008	12-31-2010	3.0 TON
1925	PH	4500H-B	N	MRL	0 MG/L	7.81 PH	01-01-2008	12-31-2010	8.5 PH
1930	TDS	2540 C	N	MRL	0 MG/L	690000.0 UG/L	01-01-2008	12-31-2010	1000000.0 UG/L

https://ndwis.ndep.nv.gov/DWW/JSP/NonTcrSampleResults.jsp?sample_number=S201009-0376&collection_date=09-07-

2010&tinwsys_is_number=296130&tinwsys_st_code=NV&tsasampl_is_number=194709&tsasampl_st_code=NV&history=1&counter=0
1 µg/L = 0.001 mg/L

None of the analytes exceed their Maximum Contaminate Level (MCL). Total Dissolved Solids is discussed in section 5.4.5 of the EA. Also, please see response to comment D-1 regarding life of the freshwater aquifer.

In addition, Rockwood (formerly Chemetall Foote) is currently implementing mitigation requirements to protect the freshwater aquifer. These requirements, specified in the Finding of No Significant Impact (FONSI) for the Electric Drive Vehicle Battery and Component Manufacturing Initiative Project produced by the Department of Energy (DOE), National Energy Technology Laboratory (NETL) in 2010, contain the following:

1. In addition to compliance with applicable regulatory and permit requirements, Chemetall shall continue to monitor water quality (including total dissolved solid, uranium concentrations, and fluoride concentrations) in all of Chemetall's potable water supply wells (CFC well #1, CFC well #2, and any future potable water supply wells of Chemetall) and in the down gradient monitoring well (CFC monitoring well #1) and shall report the results of the monitoring to the Esmeralda County Commission on a periodic basis, but no less than once every three months, so that the County Commission can assess the extent of brackish water up-coning or intrusion, if any, into the alluvial aquifers that supply potable water.

2. In additional to compliance with applicable regulatory and permit requirements, Chemetall shall continue to monitor "static" water levels in all of Chemetall's potable water supply wells (CFC well #1, CFC well #2, and any future potable water supply wells of Chemetall) and in the down gradient monitoring well (CFC monitoring well #1) and shall monitor well production and "pumping" water levels in all of Chemetall's potable water supply wells (CFC well #1, CFC well #2, and any future potable water supply wells of Chemetall) and shall report the results of the monitoring to the Esmeralda County Commission on a periodic basis, but no less than once every three months, so that the County Commission can assess the extent of aquifer depletion and the risk of brine water intrusion into the alluvial aquifer that supply potable water to the town of Silver Peak.

3. If, as a result of the proposed project, the salinity (total dissolved solids) begins to increase significantly (i.e., threatens to reach or exceed 900 milligrams per liter) in the produced potable water of the municipal wells unaccompanied by pumping on the municipal wells in excess of permitted rates, the aggregate rate of pumping from Chemetall's existing potable water supply wells (CFC well #1, CFC well #2) should be reduced to less than 500 gallons per minute instantaneous pumping rate, 3,000,000 gallons per week, and 500 acre-feet-per year; and Chemetall should either supplement its potable water supply from other sources or reduce its demand accordingly for the

duration of the time period in which salinity exceeds or threatens to exceed 900 milligrams per liter in the produced potable water of the municipal wells.

No change to the EA has been made in response to this comment.

D-8: In 2010, Rockwood (then Chemetall Foote Corp.) received BLM approval to drill up to 6 temperature gradient holes (TGHs) to a depth of 500 feet. Subsequently, Rockwood received a second approval to change the location of one TGH, and add 3 new locations, drilling to a depth of 1,000 feet. Consistent with Instructional Memorandum 2009-044, these activities were approved via Categorical Exclusion (DOI-BLM-NV-B020-2011-0017-CX and DOI-BLM-NV-B020-2011-0048-CX). Information regarding the locations of the temperature gradient holes was provided to Mr. Rupp by BLM in a letter dated June 8, 2011. No change to the EA has been made in response to this comment.

D-9: In accordance with Executive Order 13175, the BLM is required to consult with Indian Tribes on a government-to-government basis. DOI policy on consultation with Indian Tribes requires early communication with interested Tribes. As indicated in Section 3.3.3 of the EA, a letter offering consultation was sent to the Timbisha Shoshone Tribe of California on August 10, 2011. The letter asked for assistance in identifying any unknown (to BLM) tribal resources or sites of spiritual significance that could be impacted by geothermal exploration. No change to the EA has been made in response to this comment.

D-10: Socio-economic values were discussed in EA Sections 3.3.13 (Affected Environment), 4.1.13 (Environmental Consequences) and 5.4.13 (Cumulative Impacts). Surface and ground water quality and quantity are discussed in EA Sections 3.3.5, 4.1.5, and 5.4.5. Noise is discussed in EA Sections 2.1.8.6, 4.1.7, and 4.1.9. Pollution and health concerns are discussed under the headings of Air Quality, and Hazardous Materials and Waste in EA Sections 3.3.1, 3.3.4, 4.1.1, 4.1.4, 5.4.1, and 5.4.4. Traffic (Transportation and Access) was not analyzed in detail in the EA. However, the EA was modified, Section 3.2, to elaborate on the rationale for not analyzing this resource in detail.

D-11: As identified in EA Sections 2.1.3.1 and 2.1.3.2, Rockwood intends to contain fluids from flow testing activities in either closed Baker tanks, in the reserve pits constructed within the well pads, into one of the other geothermal wells drilled within the Project Area, or into the existing Pond 17W. As the Project would be constructed within an existing bermed evaporation pond, and given that the cited Play Ground and Rupp parcels are over 1.1 miles upslope from the Project area, it is highly unlikely that any “spills” from the Project would impact either the Play Ground or Rupp parcels. No change to the EA has been made in response to this comment.

D-12: No power generation is proposed under the Silver Peak Area Geothermal Exploration Project. See also the response to comment D-3. No change to the EA has been made in response to this comment.

D-13: Executive Order (EO) 13045 was identified in EA Table 5 (Resources Affected by the Proposed Action). Information has been added to the rationale column as to why the Project was in compliance with EO 13045.

Appendix D: Mailing List

Melissa Jennings
Rockwood Lithium, Inc.
Silver Peak, NV

Laura Sheline
NV Energy Rights-of-Way Dept
Reno, NV

Nancy Boland
Goldfield, NV

Rob Mrowka
Center for Biological Diversity
North Las Vegas, NV

Nevada Outdoor Recreation Assoc
Carson City, NV

Dawn Lappin
WHOA
Reno, NV

Lisa Belenky
Center for Biological Diversity
San Francisco, CA

Southern Nevada Field Office
US Fish & Wildlife Service
Las Vegas, NV

Sandra Johnson
Esmeralda County
Board of County Commissioners
Goldfield, NV

Friends of Nevada Wilderness
Reno, NV

Teri Slautauski
Tonopah, NV

George Gholson – Chair
Tribal Council
Death Valley Timbisha Shoshone Tribe
Bishop, CA

Jon Marvel
Western Watersheds Project
Hailey, ID

NDOT Right of Way Division
Carson City, NV

Barbara Durham – THPO
Timbisha Shoshone Tribe
Death Valley, CA

Katie Fite
Western Watersheds Project
Boise, ID

Frank Borghetti
Right-of-Ways Sr Agent
Reno, NV

Paul Rupp
Silver Peak, NV

Christopher Krupp
Western Lands Project
Seattle, WA

Brent Howerton
SBC Nevada Bell Right-of-Way
Reno, NV

Mr. D. Bradford Hardenbrook
Supervisory Habitat Biologist
Nevada Department of Wildlife
Reno, NV

Nevada Department of Wildlife
Tracy Kipe/Brian Hobbs
Las Vegas, NV

US Dept of Transportation
Federal Highway Div Admin
Susan Klekar
Carson City, NV

Head Librarian
Goldfield Public Library
Goldfield, NV

Honorable Mike McGinness
Nevada State Senator
Fallon, NV

Kevin Emmerich
Beatty, NV

Head Librarian
Silver Peak Public Library
Silver Peak, NV

Ed Rannells
Goldfield, NV

Daniel Patterson
SW Peer
Tucson, AZ

Ms. Ann McPherson
Department of Energy Reviewers
Environmental Review Office, EPA
San Francisco, CA

Mr. Eric S. Miskow
Nevada Natural Heritage Program
Richard H. Bryan Building
Carson City, NV

Mr. Steve Abele
U.S. Fish and Wildlife Service
Nevada Fish & Wildlife Office
Reno, NV

Honorable Dean Heller
United States Senate
Washington, D.C.