United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Winnemucca Field Office
5100 East Winnemucca Boulevard
Winnemucca, Nevada 89445-2921
http://www.nv.blm.gov/winnemucca
(775) 623-1500 or wfoweb@nv.blm.gov

In Reply Refer To:
1792/3200
NV-023.61

Dear Interested Party:

The Bureau of Land Management (BLM) is seeking public review and comment on a Preliminary Environmental Assessment (EA) for a proposal received from Ormat Nevada, Inc. (Ormat) for a geothermal resources exploration program of observation slim well drilling and full-size exploration wells on three federal geothermal leases. The proposed geothermal resources exploration program is located approximately forty-five miles southwest of Battle Mountain in Pershing County, Nevada. The EA discloses potential impacts that would result from the implementation of this project and identifies resource protection measures that could be implemented to reduce the level of expected impacts. The EA can be reviewed online at http://www.blm.gov/nv/st/en/fo/wfo.html or viewed in hardcopy at the BLM Winnemucca Field Office. Additional hardcopies are also available upon request.

Ormat has selected five sites for exploration drilling. If approved Ormat would be allowed to drill up to three small-diameter observation slim wells and three full-size exploration wells, at any of these five locations, plus construct the necessary access roads and well pads. Any subsequent exploration or development operations would require additional NEPA analysis and approvals from the BLM.

The project includes:

- Constructing slim well drill pads at up to three of the five proposed sites (including the improvement or construction, as necessary, of two access roads);
- Drilling, completing, flow-testing and monitoring a slim well to a depth of about 3,000 feet from each of the three constructed drill pads;
- Constructing full-size exploration well drill pads at up to three of the five sites, including the improvement and/or maintenance of the existing access roads, as needed;
- Drilling and completing a full-size geothermal exploration well to a depth of about 7,000 feet from each of the three constructed drill pads; and
- Obtaining a federal right-of-way across BLM surface managed lands for off-lease access.

The BLM encourages public participation in the process to help identify potential environmental and socioeconomic impacts, issues and concerns associated with the granting of this geothermal project.

Written comments are preferred and may be submitted through May 7, 2007. Please submit any comments to: Attention Fred Holzel, Jersey Valley Geothermal EA Project, BLM Winnemucca Field Office, 5100 E. Winnemucca Boulevard, Winnemucca, Nevada 89445. Comments can also be submitted by email to NV_WFO_Webmail@blm.gov with "Jersey Valley Geothermal EA Project" in the subject line.

Public comments submitted for this project, including names and addresses of commenters, will be available for public review at the Winnemucca Field Office during regular business hours 7:30 a.m. to 4:30 p.m., Monday through Friday, except federal holidays. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

If you need additional information please contact Project Lead, Fred Holzel at the Winnemucca Field Office at (775) 623-1528.

After the public review has ended, comments will be analyzed and considered as part of the decision making process.

If you have any questions, please contact Fred R. Holzel at (775) 623-1528 or at the above address.

Sincerely,

/s/ Dave Hays

Dave Hays
Assistant Field Manager
Nonrenewable Resources

PRELIMINARY
ENVIRONMENTAL ASSESSMENT

JERSEY VALLEY
GEOTHERMAL EXPLORATION PROJECT

PERSHING COUNTY, NEVADA

MARCH 2007

EA NUMBER: NV-020-07-EA-01

Lead Agency:

BUREAU OF LAND MANAGEMENT
Winnemucca Field Office
5100 E. Winnemucca Blvd.
Winnemucca, Nevada 89445

Project Applicant:

ORMAT NEVADA, INC.
6225 Neil Road, Suite 300
Reno, NV 89511-1153

PRELIMINARY ENVIRONMENTAL ASSESSMENT
JERSEY VALLEY
GEOTHERMAL EXPLORATION PROJECT

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

Page

TABLE OF CONTENTS
(continued)

Page

LIST OF TABLES

Page

TABLE OF CONTENTS
(continued)

LIST OF FIGURES

Page

LIST OF APPENDICES

PRELIMINARY ENVIRONMENTAL ASSESSMENT
JERSEY VALLEY
GEOTHERMAL EXPLORATION PROJECT

1 INTRODUCTION

1.1 Location and Summary of Proposed Actions

Ormat Nevada, Inc. (Ormat) has submitted to the Bureau of Land Management (BLM), Winnemucca Field Office (WFO), an Operations Plan, five (5) Geothermal Drilling Permit (GDP) applications to drill observation wells and an associated Right-of-Way (ROW) application. The Operations Plan includes proposals to drill additional deep wells at any one of the observation well locations, pending the results of the observation wells. The GDPs for the deep well drilling have not yet been submitted but have been identified in the Operations Plan and will be included in this proposed action.

The proposed action would be located on three federal geothermal leases encompassing approximately 5,060 acres of BLM-managed lands. These leases are located in Pershing County approximately 50 miles southeast of the town of Battle Mountain, Nevada (see Figure 1). These geothermal leases have been issued to Ormat for an initial ten-year period. Developing geothermal resources on BLM-administered public lands typically involves four phases: leasing, exploration, development/operation and abandonment/reclamation.

The operations to be conducted on these leases under the proposed Operations Plan and GDPs, if successful, could lead to additional exploration and eventually the development and production of the discovered geothermal resources. Any subsequent exploration and/or developmental operations proposed as a result of the drilling operations, beyond what are being proposed in this analysis, would require additional permit applications and prior approval from the BLM. Any additional activity would be subject to the National Environmental Policy Act (NEPA).

1.2 Purpose and Need

The project is proposed to be conducted on lands which are leased by the United States of America to Ormat. These leases convey to the lessee the “exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources.” To maintain this right, the lessee must “diligently explore the leased lands for geothermal resources until there is production in commercial quantities” applicable to each of these leases.

Ormat’s purpose for the proposed project is to conduct a geothermal resource exploration program to determine subsurface temperatures, and confirm the existence of geothermal resources, on these leases. The need is to confirm the existence of a commercial geothermal reservoir at the proposed drill sites within the federal geothermal leases.

Under the terms of the Geothermal Steam Act and its implementing regulations, BLM must respond to the proposed plans, applications and programs submitted by the lessee or the lessee’s designated operator. The BLM is also required to comply with NEPA and the Council of Environmental Quality (CEQ) regulations. The BLM WFO has determined that an Environmental Assessment (EA) would be needed to evaluate and disclose the potential environmental

impacts associated with this proposed action and any reasonable alternatives to the proposed action which would include a no action alternative.

This EA will serve as a decision-making tool to assist BLM in its determination to approve, require modification or deny the proposed actions. At the conclusion of the EA process, the BLM must determine if the proposed action, any modifications of the proposed action and/or alternatives, would cause significant environmental impacts. If not, then a Finding of No Significant Impact (FONSI) would be prepared. If, at any time during the analysis, a determination of significant impacts is made that could not be appropriately mitigated at the EA level, an Environmental Impact Statement (EIS) may be required.

1.3 Plan Conformance

The project area is primarily subject to the BLM WFO Sonoma-Gerlach Management Framework Plan (MFP), which was adopted in 1982. Objective M-5 of the Sonoma-Gerlach MFP states “Make energy resources available on all public lands and other lands containing federally owned minerals.” The MFP provides for the development of geothermal resources in noncompetitive areas and all Known Geothermal Resource Areas (KGRAs) except those which are areas of significant environmental conflict or have historical and/or cultural significance.

1.4 Relationship to Laws, Regulations, Policies, Plans or Other Environmental Analyses

1.4.1 Geothermal Steam Act and Implementing Regulations

The project is proposed to be conducted on lands which are leased by the United States of America to Ormat. The lessee must pay annual rentals to the federal government, and must expend increasing amounts to have these funds qualify as diligent exploration expenditures, until the production of geothermal resources in commercial quantities is achieved. The Proposed Action consists of exploration operations to be conducted on federal geothermal leases which, if successful, could lead to additional exploration and eventually the development and production of the discovered geothermal resources. Any subsequent exploration or development operations would require additional approvals, and NEPA analysis, from the BLM.

The Geothermal Steam Act of 1970 (Act) (30 USC 1001-1025) gives the Secretary of the Interior the responsibility and authority to manage geothermal operations on lands leased for geothermal resource development by the United States of America, and the Secretary has delegated this authority to the BLM. Pursuant to the regulations adopted to implement applicable portions of the Act (43 CFR 3251.12 and 43 CFR 3261.20), the BLM will review the drilling and completion programs submitted by a federal geothermal lessee and will approve the programs if they comply with the Act, the regulations adopted pursuant to the Act (43 CFR 3200 et seq.), other directives issued by the BLM (Geothermal Resource Operational (GRO) Orders, Notices to Lessees, etc.), any special stipulations applicable to the federal geothermal leases, and any other applicable laws and regulations. All operations conducted on the geothermal lease by the geothermal lessee are subject to the approval of the BLM under the Geothermal Steam Act. The BLM must also comply with the requirements of the NEPA prior to approving the exploration permit, operations plan and the Geothermal Drilling Permits.

1.4.2 Federal Land Policy and Management Act and Rights-of-Way Regulations

The Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1761-1771) directs the BLM to grant and manage rights-of-way (ROWs) on public lands managed by the BLM. As

defined in 43 CFR 2800, a ROW grant is required to use a specific piece of public land for certain projects, including roads, pipelines, transmission lines, and communication sites. ROWs are granted to any qualified individual, business, or government entity to direct and control the use of ROWs in a manner that protects natural resources; prevent unnecessary or undue degradation to public lands; promote the use of ROWs in common; and coordinate with state and local governments and interested individuals. The BLM must also comply with the requirements of NEPA prior to approving the ROW grant.

1.4.3 2005 Energy Policy

The 2005 Energy Policy Act was signed by President George Bush on August 8, 2005. This act contains several provisions aimed at making geothermal energy more competitive with fossil fuels in generating electricity. In May 2001, the President adopted a National Energy Policy to respond to the nation's increasing energy needs. This policy recognizes the importance the federal government's affect on the supply and use of energy. In response to the policy, the BLM developed an implementation strategy titled: BLM Implementation of the National Energy Policy.

1.4.4 Geothermal Resources Leasing Programmatic Environmental Assessment

In 2002 the BLM WFO completed the "Geothermal Resources Leasing Programmatic Environmental Assessment" (BLM WFO 2002). Special stipulations developed in this Programmatic Environmental Assessment were applied to geothermal resource leases subsequently issued by the BLM, including the three federal geothermal leases (NVN-74881, NVN-74883, and NVN-77483) issued to Ormat. Copies of these special stipulations are attached to this EA as Appendix A, Appendix B, and Appendix C. Ormat is required to comply with these special lease stipulations.

1.4.5 Other Plans

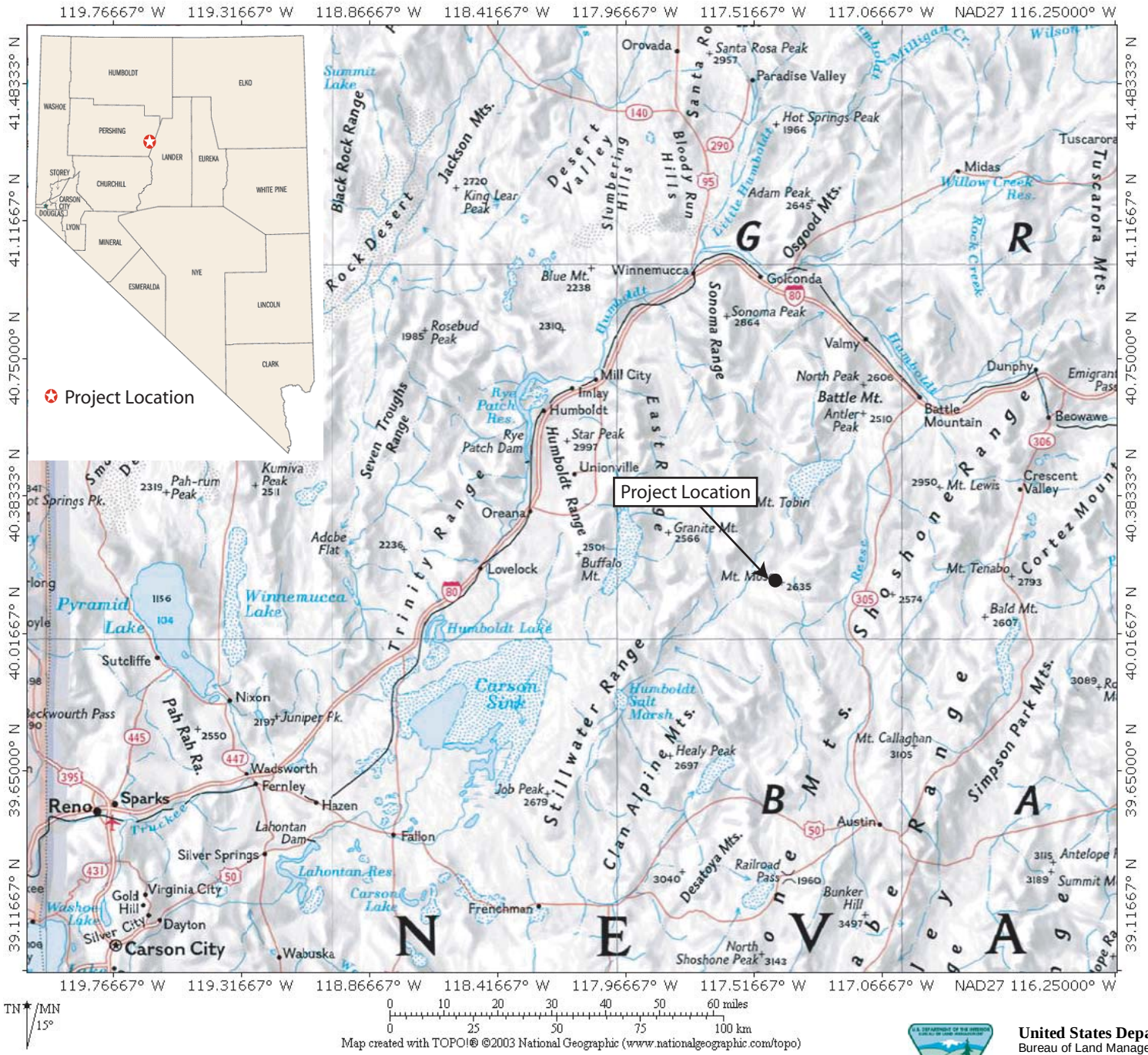
The project area is located in Pershing County, Nevada and the Proposed Action is in conformance with applicable Pershing County plans (Wren 2004).

1.5 Identified Issues

This EA was prepared in accordance with BLM geothermal regulations (43 CFR 3200 et. seq.), the Council of Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500 et. seq.); and BLM guidelines for implementing NEPA (BLM 1988). This EA was prepared with the assistance of Environmental Management Associates, Inc. (EMA), using information gathered from the BLM, other federal agencies, state agencies, local agencies, Ormat, and publicly available literature. The scope of this EA is based upon specific issues and concerns identified by BLM. These issues and concerns include:

- The quantity and quality of waters on public lands;
- Access to water by wildlife and livestock;
- Riparian and wetland habitat;
- Spring-dwelling species;
- Migratory birds during the nesting period; and

- Sensitive bat species.



United States Department of the Interior
Bureau of Land Management
Winnemucca Field Office
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445

Figure 1: Project Location Map

Map Date: 7/24/06

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

2.1.1 Overview and Location of Proposed Project

The submitted Operations Plan proposes to conduct a geothermal resources exploration program of slim and full-size well drilling and testing on public lands leased for geothermal resource development in Pershing County, Nevada.

Ormat has selected five sites for exploration drilling. Slim well drill pads would be constructed at up to three of the five proposed sites. From each of these three drill pads a slim well would be drilled and completed to a depth of about 3,000 feet and flow-tested to obtain samples of the geothermal fluid. Full-size exploration well drill pads would also be constructed at up to three of these same five sites, either by enlarging all three of the previously constructed slim well drill pads or by constructing one or two new drill pads and enlarging only two or one of the previously constructed slim well drill pads. A full-size exploration well would then be drilled and completed to a depth of about 7,000 feet from each of the three constructed full-size drill pads. Each full-size exploration well would be flow-tested to obtain additional samples of the geothermal fluid and geothermal resource production information from the geothermal reservoir.

Each proposed drill site is designed to explore a specific geophysical or geologic target. These targets were identified during previously completed geophysical exploration and surface geologic mapping. The location of each proposed well site was then adjusted to reduce or avoid known environmental issues or constraints.

Principal access to the project area from the south is from U.S. Highway 50 north on Churchill County's Dixie Valley Road, then north on Pershing County's Jersey Valley Road. From the north, principal access is southeast from Interstate 80 at Battle Mountain on State Route 305, then southeast on Lander County's Buffalo Valley Road, then southeast on Pershing County's Jersey Valley Road (see Figure 2).

The five proposed exploration well sites are each listed in Table 1 by lease number, well name (using the Modified Kettleman numbering system), township and range, legal description, and approximate UTM coordinates.

Table 1: Geothermal Exploration Well Sites

Lease No.	Well Name (Modified Kettleman No.)	Township/ Range	Legal Description (Section Number & Aliquot Part)	Approximate UTM Coordinates (NAD27)	
				Easting (m)	Northing (m)
NVN-77483	18-27	T27N, R40E	SW1/4SW1/4, Section 27	459668	4447390
NVN-74881	81-28	T27N, R40E	NE1/4NE1/4, Section 28	459584	4448844
NVN-74881	44-28	T27N, R40E	SE1/4NW1/4, Section 28	458698	4448225
NVN-74881	86-29	T27N, R40E	NE1/4SE1/4, Section 29	457926	4447744
NVN-74883	33-33	T27N, R40E	SE1/4NW1/4, Section 33	458499	4446796

The following is a description of each of the geothermal leases to be explored and the exploration operations to be conducted on or for that lease.

Geothermal Lease NVN-77483: This lease consists of Sections 21, 22, 27 and 34 of T27N, R40E, MDB&M, except for a 40-acre parcel of private land in Section 34 (see Figure 2). Well site 18-27 is proposed within lease NVN-77483. Ormat will comply with all special lease stipulations attached to lease NVN-77483 (see Appendix A).

Well site 18-27

Well site 18-27 is proposed on Section 27. Should site 18-27 be selected for slim well drilling, a slim well pad measuring approximately 150 feet by 200 feet would be constructed. Should site 18-27 be selected for full—size exploration well drilling, a pad measuring approximately 300 feet by 250 feet would be constructed. Estimated surface disturbance calculations associated with well pad construction activities are presented in Table 2.

Access to well site 18-27 would begin at Pershing County's Jersey Valley Road at approximately the NW1/4NE1/4 of Section 21, which is the last point of legal access. The on-lease access would proceed approximately 1.0 miles south-southeast along an existing dirt road, then directly south on this same existing road for approximately 1.0 mile to the SW1/4SW1/4 of Section 27. At this point, an approximately 0.1-mile section of access road due west to the drill site would need to be improved. This short 0.1-mile section of road is currently acknowledged in a Notice of Intent under the 40 CFR 3809 Surface Mining Management Regulations for Geologix Exploration (U.S.), Inc. (see Figure 2). Please see Section 2.1.2 for a discussion on road improvement activities. Estimated surface disturbance calculations associated with road improvement activities are presented in Table 2.

Geothermal Lease NVN-74881: This lease consists of Sections 28 and 29 of T27N, R40E, MDB&M (see Figure 2). Well sites 86-29, 44-28, and 81-28 are proposed within lease NVN-74881. Ormat will comply with all special lease stipulations attached to lease NVN-74881 (see Appendix B).

Well 86-29

Well site 86-29 is proposed on Section 29. Should site 86-29 be selected for slim well drilling, a slim well pad measuring approximately 150 feet by 200 feet would be constructed. Should site 86-29 be selected for full—size exploration well drilling, a pad measuring approximately 300 feet by 250 feet would be constructed. Estimated surface disturbance calculations for well pad construction are presented in Table 2.

Proposed drill site 86-29 would be immediately adjacent to Jersey Valley Road, and no additional new access road construction would be required.

Well 44-28

Well site 44-28 is proposed on Section 28. Should site 44-28 be selected for slim well drilling, a slim well pad measuring approximately 150 feet by 200 feet would be constructed. Should site 44-28 be selected for full—size exploration well drilling, a pad measuring approximately 300 feet by 250 feet would be constructed. Estimated surface disturbance calculations for well pad construction are presented in Table 2.

Access to well site 44-28 would begin at Pershing County's Jersey Valley Road at approximately the SW1/4NW1/4 of Section 28, which is the last point of legal access. The on-lease access would proceed with the construction of a new 0.3-mile long road due east to the well pad (see Figure 2). Please see Section 2.1.2 for a discussion on road construction activities. Estimated surface disturbance calculations associated with road construction activities are presented in Table 2.

Well 81-28

Well site 81-28 is proposed on Section 28. Should site 81-28 be selected for slim well drilling, a slim well pad measuring approximately 150 feet by 200 feet would be constructed. Should site 81-28 be selected for full—size exploration well drilling, a pad measuring approximately 300 feet by 250 feet would be constructed. Estimated surface disturbance calculations for well pad construction are presented in Table 2.

There is no existing on-lease access to well site 81-28. Off lease access to well site 81-28 would begin at Pershing County's Jersey Valley Road at approximately NW1/4NE1/4 of Section 21, which is the last point of legal access. Access would continue along an existing road to a point approximately 1.0 miles south-southeast. From this point, access would proceed approximately 0.1 miles west to the proposed drill site on a new road constructed specifically for access to this well site. Please see Section 2.1.2 for a discussion on road construction activities. Off-lease access to site 81-28 requires a ROW.

ROW

Ormat has filed an application for a ROW for the specific off-lease roads accessing Well 81-28 (see Figure 3). This ROW would begin off Jersey Valley Road at approximately the NW1/4NE1/4 of Section 21, and proceed 1.0 miles south-southeasterly along an existing road through Section 22. From this point, access would proceed approximately 0.1 miles west on a new road constructed specifically for access to this well site.

Geothermal Lease NVN-74883: This lease consists of Sections 32 and 33 of T27N, R40E, MDB&M, except for a 40-acre parcel of private land in Section 33 (see Figure 2). Well site 33-33 is proposed within lease NVN-74883. Ormat will comply with all special lease stipulations attached to lease NVN-74883 (see Appendix C).

Well 33-33

Well site 33-33 is proposed on Section 33. Should site 33-33 be selected for slim well drilling, a slim well pad measuring approximately 150 feet by 200 feet would be constructed. Should site 33-33 be selected for full—size exploration well drilling, a pad measuring approximately 300 feet by 250 feet would be constructed. Estimated surface disturbance calculations for well pad construction are presented in Table 2.

Access to well site 33-33 would begin at Pershing County's Jersey Valley Road at approximately SE1/4SE1/4 of Section 32, which is the last point of legal access. The on-lease access would proceed approximately 0.5 miles south-southeasterly along an existing dirt road (see Figure 2). Sections of this existing dirt road would need to be improved. Please see Section 2.1.2 for a discussion on road improvement activities. Estimated surface disturbance calculations associated with road improvement activities are presented in Table 2.

Table 2: Potential Surface Disturbance Associated with the Proposed Action

Drill site	Associated Surface Disturbance per Activity (acres)			
	Slim Well Pad Construction[1]	**Full-Size Well Pad Construction**[2]	**Access Road Construction Needed**	**Access Road Improvement Needed**
18-27	0.69	1.73	0.00	0.19
86-29	0.69	1.73	0.00	0.00
44-28	0.69	1.73	0.58	0.00
81-28	0.69	1.73	0.19	0.00
33-33	0.69	1.73	0.00	0.00
TOTALS	*3.45*	*8.65*	*0.77*	*0.19*

[1] Three slim well pads will be constructed from any of these five sites.
[2] Three full-size well pads will be constructed from any of these sites, either by enlarging all three of the previously constructed slim well drill pads or by constructing one or two new drill pads and enlarging only two or one of the previously constructed slim well drill pads.

The estimated maximum total area of new surface disturbance required for the six well pads (three slim well pads and three full-size well pads) would be about 6.5 acres (assuming that three new slim well pads were constructed, two new full-size well pads were constructed, and only one slim well pad was consumed in the construction of a full-size exploration well pad). However, as it is unknown which drill site will be selected, an estimated 8.65 acres of surface disturbance is assumed as this number represents the maximum pad construction size on each proposed drill site. The estimated total area of surface disturbance required for access road construction and improvement would be about 0.96 acres. Total surface disturbance, therefore, is assumed to be 9.61 acres (8.65 acres for pad construction and 0.96 acres for access road construction/improvements). This 9.61 acres of surface disturbance will be carried through for all subsequent analysis.

2.1.2 Access Road Construction and Improvement Activities

The new access roads would be constructed, the existing access roads improved, and the new and existing access roads maintained, to safely accommodate the 18-wheeled trucks which must access the well drill pads during drilling. This includes an all-weather surface with a road bed width of 16 feet, a maximum grade of six percent and a turning radius of no less than 50 feet, consistent with the best management practices for road construction applicable to temporary roads (see Appendix E). Typical construction and improvement activities may include grading, widening, and/or blading.

2.1.3 Site Preparation Activities

Each drill site would be prepared to create a level pad for the drill rig and a graded surface for the support equipment. Storm water runoff from undisturbed areas around the constructed drill pads would be directed into ditches surrounding the drill pad and back onto undisturbed ground

consistent with best management practices for storm water. Each site would be graded to prevent the movement of storm water off of the constructed site.

Fenced reserve pits would be constructed in accordance with best management practices identified in the "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (The Gold Book)" (Fourth Edition – 2006) on each pad for the containment and temporary storage of water, drill cuttings and waste drilling mud during drilling operations. For the drilling of each slim well, the reserve pit would measure approximately 15 feet by 40 feet by up to 10 feet deep. For the drilling of each full-size exploration well, the reserve pit would measure approximately 75 feet by 200 feet by up to 7 feet deep.

Typical site layouts for the slim well and full-size exploration well sites are provided as Figure 4 and Figure 5, respectively. Actual dimensions of each drill pad would be modified to best match the specific physical and environmental characteristics of the site and to minimize grading.

2.1.4 Water for Grading and Drilling

Water required for full-size well drilling could average 20,000 gallons per day. Water requirements for slim well drilling, site and road grading, construction and dust control would average substantially less. One or more portable water tank(s) holding a combined total of at least 10,000 gallons, but not more than 60,000 gallons, would be maintained on the well sites during drilling operations.

Water necessary for all of these activities would be obtained from an established private ranch source and trucked to each construction or drill site. However, should such a source not be available, shallow water well(s) would be drilled from one or more of the proposed drill sites as approved by the BLM and under a waiver for the temporary use of ground water from the Nevada Department of Water Resources. Each water well would be temporary, drilled by a licensed water well driller to a depth necessary to intersect productive sands, gravels or fractures (estimated at approximately 150 feet), and plugged and abandoned in accordance with NAC 534. No additional surface disturbance would be associated with the drilling of each temporary water well.

2.1.5 Geothermal Slim Well Drilling, Testing and Monitoring

Each slim well would be drilled using a truck-mounted rig equipped with diesel engines, fuel and drilling mud storage tanks, mud pumps, and other typical auxiliary equipment. During drilling the top of the drill rig derrick would be from 30 to 70 feet above the ground surface, depending on the rig used. An average of four to six small trucks/service vehicles/worker's vehicles could be driven to the active slim well site each day throughout the typical 15-day drilling process. Difficulties encountered during the drilling process, including the need to re-drill the slim well, could as much as double the time required to successfully complete each slim well. Drilling would be conducted 24-hours per day, 7-days per week by a crew of up to three workers. Other support personnel (geologists, suppliers, etc.) could bring the onsite total number of workers to at times six or more persons. The drilling supervisor and mud logger (if any) would typically sleep in a trailer on the drill site while the well is being drilled.

Each slim well would be drilled or cored and completed to a nominal depth of approximately 3,000 feet, or the depth selected by the project geologist, consistent with the drilling program submitted with the Geothermal Drilling Permit (see Figure 6). Once drilled or cored to the final depth, the drilling mud in the well would be circulated out of the well bore using water. The water

and/or geothermal fluid in the well would be bailed by either lifting with a mechanical bailer or by lifting the water and/or geothermal fluid out of the well bore with air pumped into the well bore so that a clean sample of the geothermal fluid in the reservoir could be obtained for chemical analysis. Alternatively, if the well is capable of flowing, the well may be flowed to the surface through a small steam separator/muffler to separate the steam (which is discharged into the air) from the geothermal water (which is discharged into steel tanks or the reserve pit) so that the geothermal fluid can be sampled.

The slim well would be drilled with air or a non-toxic, temperature-stable drilling mud composed of a bentonite clay-water or clay-polymer-water mix to lubricate and cool the drill bit, bring the rock cuttings to the surface for discharge into the mud tank, and prevent loss of drilling fluids into the rock. Additional additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss, in conformance with the submitted drilling mud program. Additional drilling mud would be mixed and added to the drilling rig's mud system as needed to maintain the required quantities of the mud.

Following the cementing of the surface casing, "blowout" prevention equipment (BOPE) would be installed. The BOPE, which is typically inspected and approved by the BLM and/or the Division of Minerals of the Nevada Commission on Mineral Resources (NDOM), as applicable, would be installed, tested and ready for use while drilling the slim well to ensure that any geothermal fluids encountered do not flow uncontrolled to the surface. Continuous hydrogen sulfide monitors would be on the drill rig floor and at the mud tanks and shaker to alert workers should elevated hydrogen sulfide levels be detected, and the BOPE would be in place to shut off any unexpected gas flows.

After the slim well 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. 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 (for pH and metals and TPH or oil & grease concentrations) to confirm that they are not hazardous. 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. When the slim well is no longer required for monitoring, it would also be abandoned by filling the well bore with clean, heavy abandonment mud and cement until the top of the cement is at ground level, then cutting off the casing and tubing below ground level.

Following the abandonment of the slim wells, and if not needed for the full-size exploration wells, the access roads and well sites constructed as part of slim well project, as well as the short section of road improved to reach well site 18-27, would be reclaimed. These well pads and roads would be disked and graded, if necessary, to de-compact the soil, turn under any applied gravel, and restore grade (if necessary), and the stockpiled topsoil (if any) would be placed back over the disturbed areas. If necessary to re-vegetate the disturbed areas, a BLM-approved seed mix certified as being free of noxious weed materials would be used to seed the areas. The other existing roads used to access these well sites would not be reclaimed.

2.1.6 Full-Size Geothermal Exploration Well Drilling, Testing and Monitoring

The full-size geothermal exploration wells are designed to drill into and flow test the geothermal reservoir to confirm the characteristics of the geothermal reservoir and determine if the geothermal resource is commercially viable.

Each full-size exploration well would be drilled with a large rotary drill rig. During drilling, the top of the drill rig mast could be as much as 160 feet above the ground surface, and the rig floor could be 20 to 30 feet above the ground surface. The typical drill rig and associated support equipment (rig floor and stands; draw works; mast; drill pipe; trailers; mud, fuel and water tanks; diesel generators; air compressors; etc.) would be brought to the prepared pad on 25 or more large tractor-trailer trucks. Additional equipment and supplies would be brought to the drill site during ongoing drilling and testing operations. As many as ten or more tractor-trailer truck trips would be generated on the busiest day, although on average about two to three large tractor-trailer trucks (delivering drilling supplies and equipment), and about eight small trucks/service vehicles/worker vehicles, would be driven to the site each day throughout the typical 45-day drilling process. Difficulties encountered during the drilling process, including the need to work over or to re-drill the hole, could double the time necessary to successfully complete a full-size exploration well. Drilling would be conducted 24-hours per day, 7-days per week by a crew of nine to ten workers. During short periods, the number of workers on site during drilling would be as high as 18. The drilling supervisor and mud logger would typically sleep in a trailer on the drill site while each full-size well was being drilled.

Each full-size exploration well would be drilled and cased to a design depth of approximately 7,000 feet, or the depth selected by the project geologist. Figure 7 provides a nominal full-size exploration well completion profile. The BOPE, which is typically inspected and approved by the BLM, would be utilized while drilling below the surface casing. During drilling operations, a minimum of 10,000 gallons of cool water and up to 12,000 pounds of inert, non-toxic, non-hazardous barite (barium sulfate) would likely be stored at each well site for use in preventing uncontrolled well flow (“killing the well”), as necessary. Continuous hydrogen sulfide monitors would be on the drill rig floor and at the mud tanks and shaker to alert workers should elevated hydrogen sulfide levels be detected, and the BOPE would be in place to shut off any unexpected gas flows.

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. Variable concentrations of additives would be added to the drilling mud as needed to prevent corrosion, increase mud weight, and prevent mud loss. Some of the mud additives may be hazardous substances, but they would only be used in low concentrations that would not render the drilling mud toxic. Additional drilling mud would be mixed and added to the mud system as needed to maintain the required quantities.

In the event that very low pressure areas were encountered, compressed air may be added to the drilling mud, or used instead of drilling mud, to reduce the weight of the drilling fluids in the hole and assist in carrying the cuttings to the surface. The air, any drilling mud, rock cuttings, and any reservoir fluids brought to the surface would be diverted through a separator/muffler to separate and discharge the air and water vapor to the air and the drilling mud and cuttings to the reserve pit.

Each full-size exploration well may need to be worked over or redrilled if mechanical or other problems are encountered while drilling or setting casing which prevent proper completion of the well in the targeted geothermal reservoir or if the well does not exhibit the anticipated permeability, productivity or injectivity. Depending on the circumstances encountered, working over a well may consist of lifting the fluid in the well column with air or gas or stimulation of the formation using a dilute mixture of hydrochloric (muriatic) and hydrofluoric acids or rock fracturing techniques. Well redrilling may consist of reentering and redrilling the existing well

bore; reentering the existing well bore and drilling and casing a new well bore; or sliding the rig over a few feet on the same well pad and drilling a new well bore through a new conductor casing.

Once the slotted liner has been set in the bottom of the well bore, and while the drill rig is still over the full-size exploration well, the residual drilling mud and cuttings would be flowed from the well bore and discharged to the reserve pit. This may be followed by one or more short-term flow tests, each lasting from two to four hours and also conducted while the drill rig is over the well. Each test would consist of flowing the full-size exploration well into portable steel tanks brought onto the well site while monitoring geothermal fluid temperatures, pressures, flow rates, chemistry and other parameters. An “injectivity” test may also be conducted by injecting the produced geothermal fluid from the steel tanks back into the well and the geothermal reservoir. The drill rig would likely be moved from the well site following completion of these short-term test(s).

One or more long-term flow test(s) of each full-size exploration well drilled would likely be conducted following the short-term flow test(s) to more accurately determine long-term well and geothermal reservoir productivity. The long-term flow test(s), each lasting approximately five days or more, would be conducted by either pumping the geothermal fluids from the well through onsite test equipment closed to the atmosphere (using a line shaft turbine pump or electric submersible pump), or allowing the well to flow naturally to the surface, where the produced steam and non-condensable gases (including any hydrogen sulfide), separated from the residual geothermal fluid, would be discharged into the atmosphere. In either case, a surface booster pump would then pump the residual produced geothermal fluid to the constructed reserve pit. The onsite test equipment would include standard flow metering, recording, and sampling apparatus.

Following completion of full-size exploration well testing, all of the drilling and testing equipment would be removed from the site. The surface facilities remaining on the site would likely consist only of several valves on top of the surface casing, which would be chained and locked. Pressure and temperature sensors may be installed in the hole at fixed depths to monitor any changes in these parameters over time. A temperature profile of the well may also be run.

If a full-size exploration well is judged by Ormat to have commercial potential, well operations would likely be suspended pending application for and receipt of regulatory approvals to place the well into commercial service. The well would likely continue to be monitored while these approvals are being processed. If a full-size exploration well is judged by Ormat to have no commercial potential, it may continue to be monitored, but would 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, 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 removed, the casing cut off well below ground surface and the hole backfilled to the surface. The well pad would then be restored in conformance with BLM surface reclamation requirements, which typically includes re-grading the pad, if necessary to restore grade; placing the stockpiled topsoil (if any) back over the site; and, if necessary to re-vegetate the disturbed areas, seed the pad with a diverse perennial seed mix certified as being free of noxious weed materials.

2.1.7 Schedule of Exploration Activities

Ormat proposes to initiate activities as soon as the required project permits and approvals are obtained, most likely by spring of 2007. This project would be implemented over the next one to four years.

2.1.8 Adopted Environmental Protection Measures

Ormat would implement the following additional environmental protection measures:

- Water would be applied to the 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 landfill facility.

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 IV-3 (BLM 1988)]. No unresolved conflicts regarding the proposed action have been identified to drive the creation of any alternatives which would still meet Ormat's purpose for the project: to determine subsurface temperatures and confirm the existence of geothermal resources within the federal geothermal leases comprising the project area. Therefore, no alternatives (other than the required "No Action Alternative") will be analyzed in this Environmental Assessment.

2.3 No Action Alternative

The No Action Alternative would occur if Ormat was prevented from implementing the project as proposed on federal lands, and the environmental effects from implementation of the project would not occur as proposed. Implementation of the No Action Alternative would not meet Ormat's purpose and need for the project. Selection of the No Action Alternative may also impair geothermal lease development rights granted to Ormat through the issuance of the federal geothermal leases.

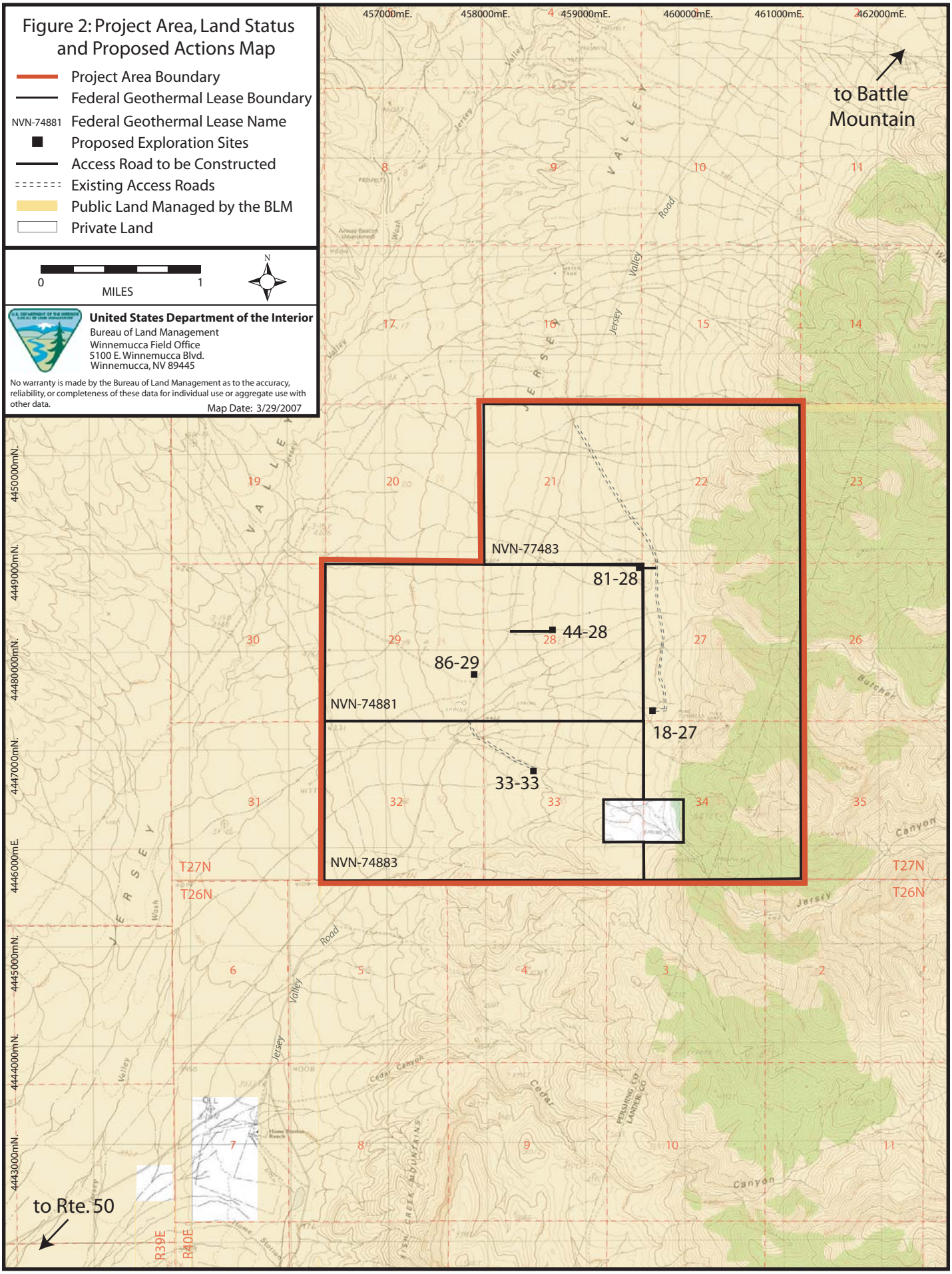


Figure 2: Project Area, Land Status and Proposed Actions Map
Project Area Boundary
Federal Geothermal Lease Boundary
NVN-74881 Federal Geothermal Lease Name
Proposed Exploration Sites
Access Road to be Constructed
Existing Access Roads
Public Land Managed by the BLM
Private Land
0
MILES
1
N
United States Department of the Interior
Bureau of Land Management
Winnemucca Field Office
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445
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.
Map Date: 3/29/2007
457000mE.
458000mE.
459000mE.
460000mE.
461000mE.
462000mE.
to Battle Mountain
4450000mN.
4449000mN.
4448000mN.
4447000mN.
4446000mE.
4445000mN.
4444000mN.
4443000mN.
NVN-77483
81-28
44-28
86-29
NVN-74881
18-27
33-33
NVN-74883
T27N
T26N
R39E
R40E
to Rte. 50

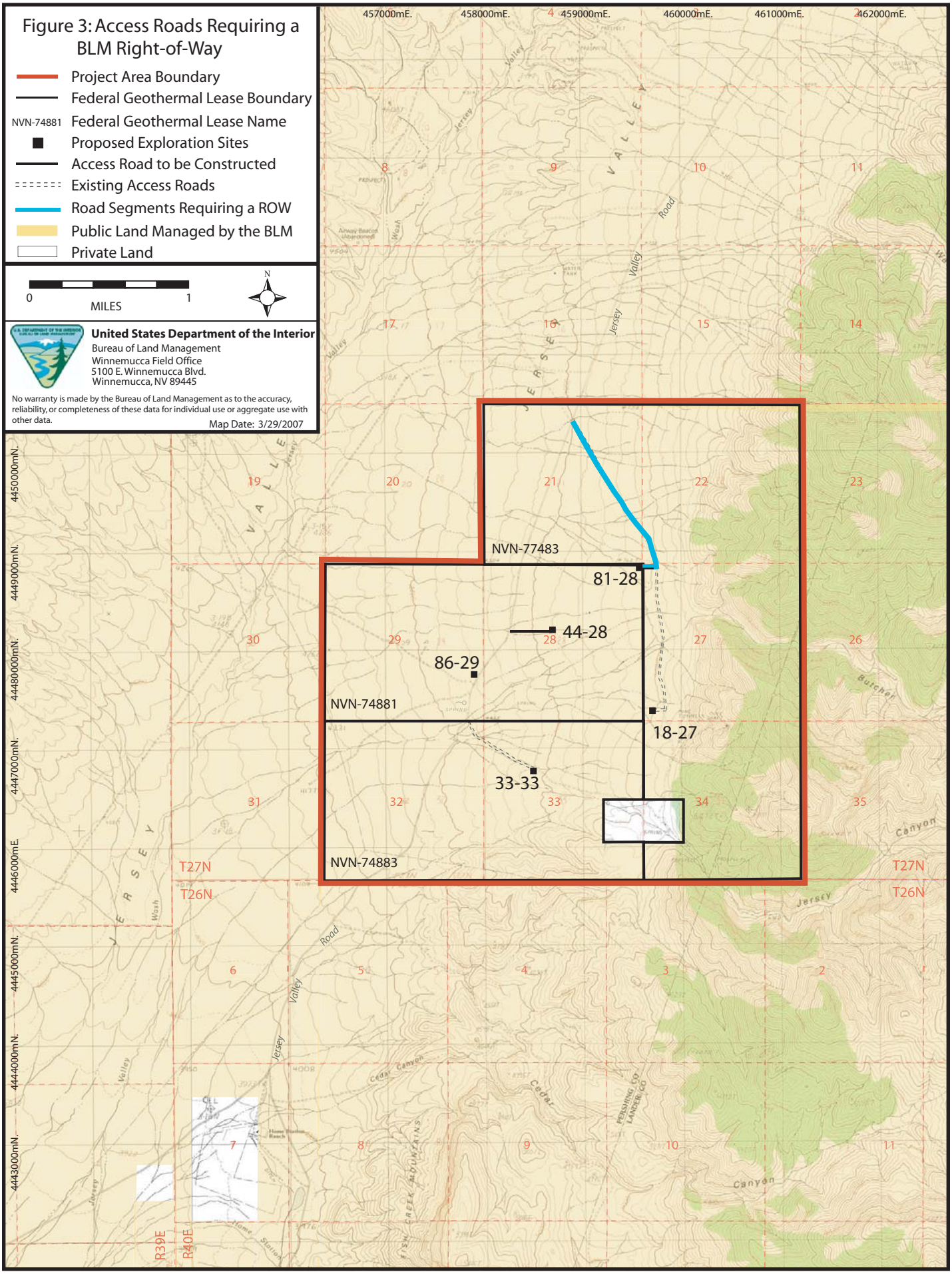


Figure 3: Access Roads Requiring a BLM Right-of-Way
Project Area Boundary
Federal Geothermal Lease Boundary
NVN-74881 Federal Geothermal Lease Name
Proposed Exploration Sites
Access Road to be Constructed
Existing Access Roads
Road Segments Requiring a ROW
Public Land Managed by the BLM
Private Land
0
MILES
1
N
United States Department of the Interior
Bureau of Land Management
Winnemucca Field Office
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445
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.
Map Date: 3/29/2007
457000mE.
458000mE.
459000mE.
460000mE.
461000mE.
462000mE.
4450000mN.
4449000mN.
4448000mN.
4447000mN.
4446000mE.
4445000mN.
4444000mN.
4443000mN.
NVN-77483
81-28
44-28
86-29
NVN-74881
18-27
33-33
NVN-74883
T27N
T26N
R39E
R40E
JERSEY VALLEY
Jersey Valley Road
Cedar Canyon
Butcher Canyon
Fishing Co. Lander Co.

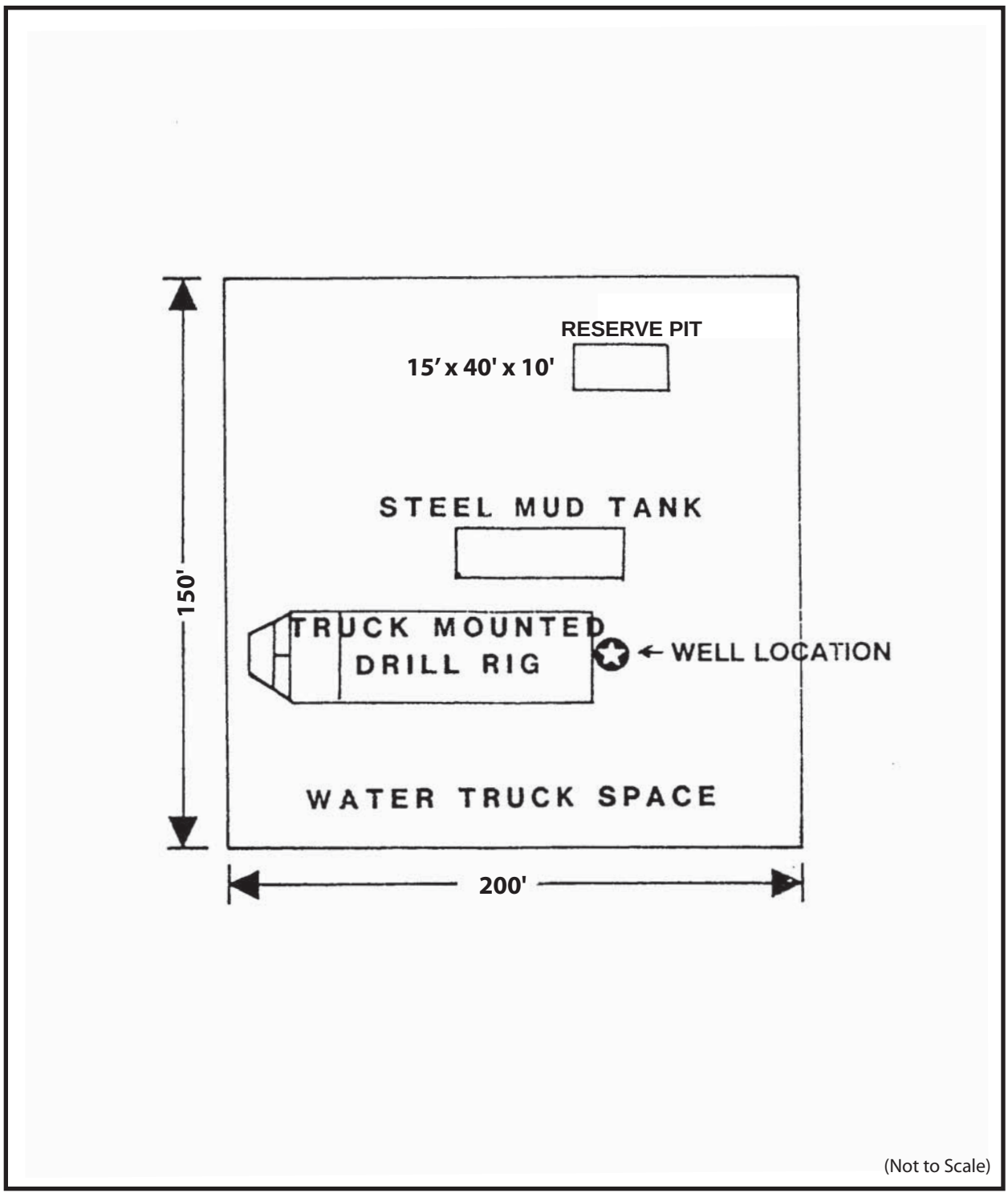


Figure 4: Typical Slim Well Site Layout

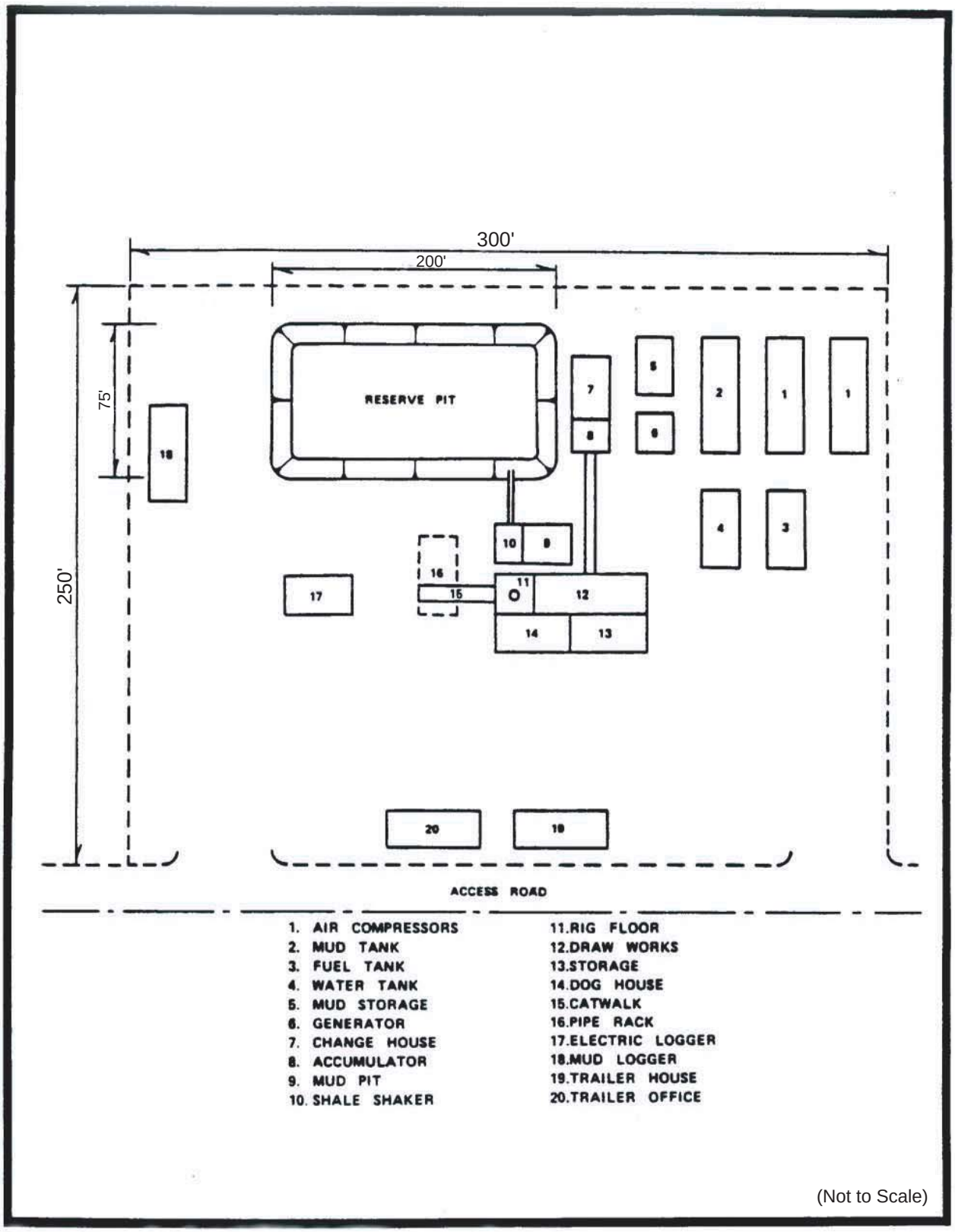


Figure 5: Typical Geothermal Exploration Well Site Layout

Proposed Slim Well Completion Diagram

Location: Jersey Valley 3000' Slim Well
Pershing County, Nevada

Datum:

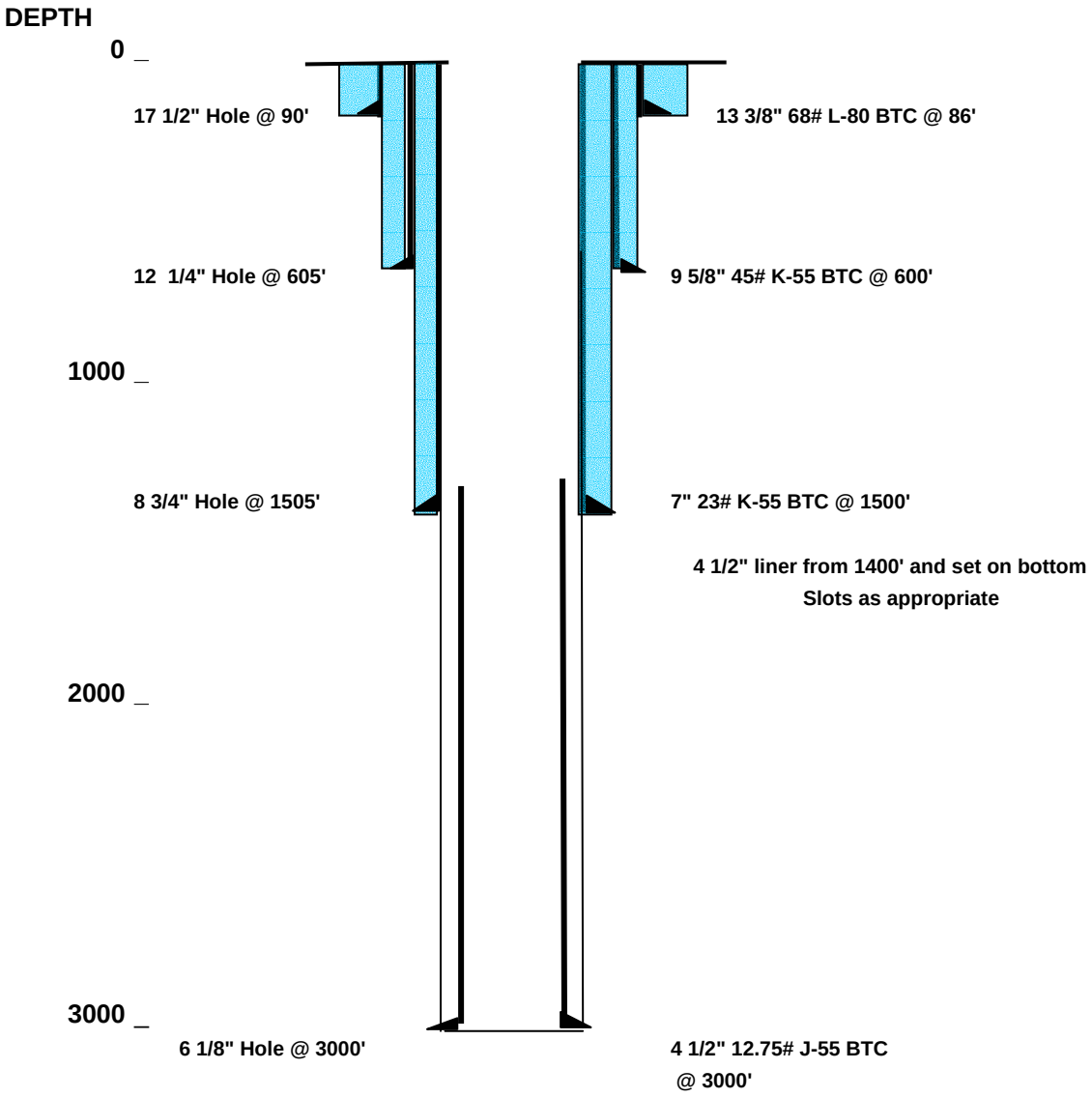


Figure 6. Typical Slim Well Completion Profile

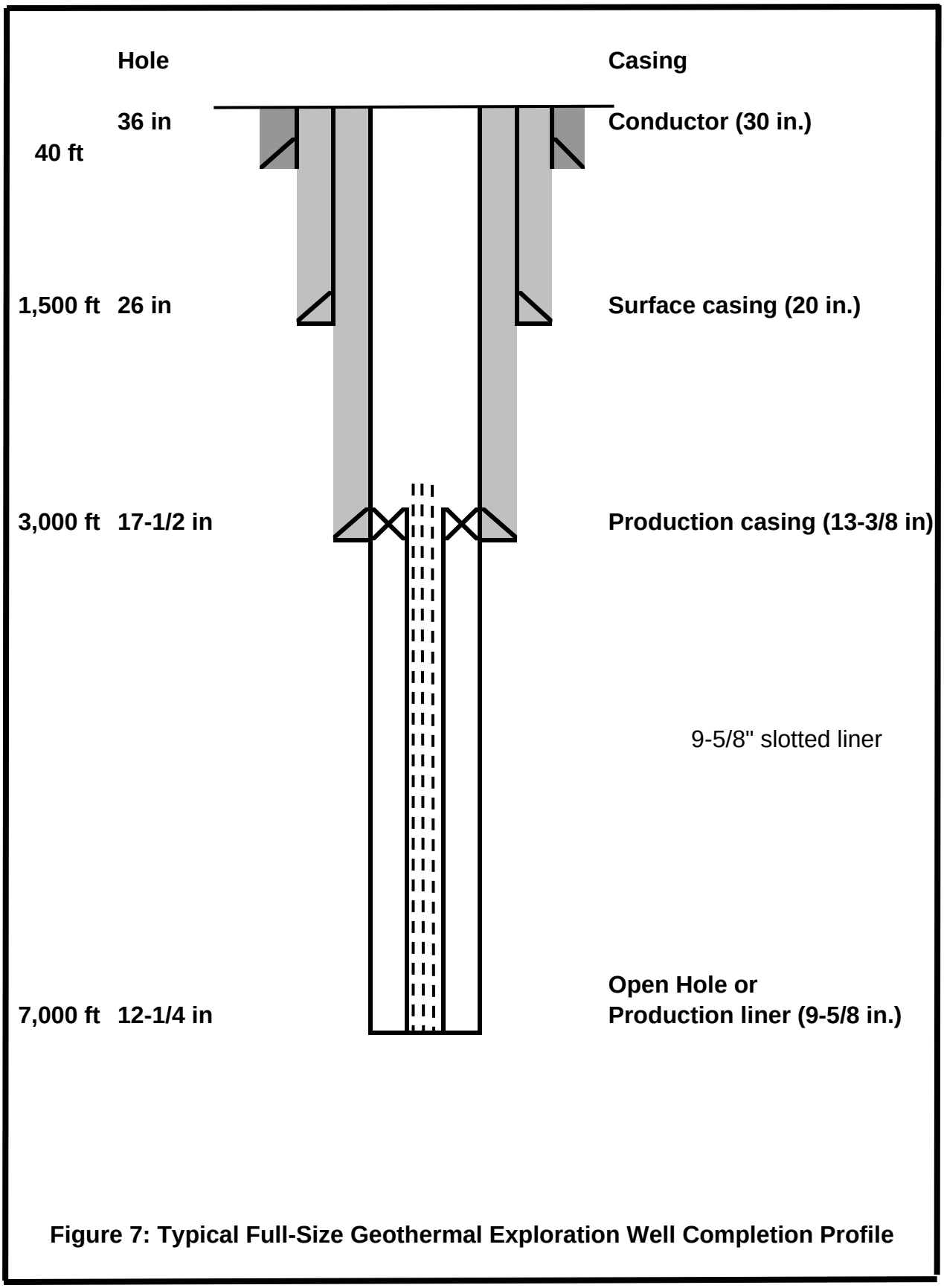


Figure 7: Typical Full-Size Geothermal Exploration Well Completion Profile

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Critical Elements

Critical elements of the human environment are subject to requirements specified in statute, regulation, or executive order and must be addressed in any document prepared pursuant to NEPA. The BLM NEPA Handbook (H-1790-1), as updated (BLM 1988), stipulates that if the resource or value is not present or is not affected by the Proposed Action or project alternatives, this may be documented in the EA as a negative declaration. The Proposed Action has been analyzed to assess direct, indirect, and cumulative impacts to the critical elements of the human environment and the other important resources listed in Table 3.

Those elements or resources marked as “not present” in Table 3 are not present within or adjacent to the three leases (project area). Those elements or resources marked as “present not affected” may be present within or adjacent to the project area but would not be impacted by the Proposed Action. Those elements or resources marked as “present affected” may be found within or adjacent to the project area and may be impacted by the Proposed Action. Elements or resources discussed further in this EA are identified in the column marked as “reference section,” with the appropriate section listed for the affected environment and environmental consequences analysis. Elements or resources which contain information in the “comment” column reflect any negative findings and are not discussed further in this EA.

3.2 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 standard (“criteria”) air pollutants (U.S. Environmental Protection Agency 2006). The Nevada Department of Conservation and Natural Resources (NDCNR), Division of Environmental Protection (NDEP), Bureau of Air Pollution Control (BAPC) has been delegated responsibility by both the federal Environmental Protection Agency (USEPA) and the State of Nevada to regulate air pollution and emissions of air pollutants in this 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 Class I air quality units, or American Indian Class I air quality lands (BLM WFO 2002).

Table 3: Critical Elements and Other Resources Affected by the Proposed Action

Critical Elements	Not Present	Present Not Affected	Present Affected	Reference Section	Comments
Air Quality			X	3.2; 4.1.1; 5.4.1	
Areas of Critical Environmental Concern (ACECs)	X			N/A	The proposed project is not located in or near any ACECs (BLM WFO 2002).
Cultural Resources		X		3.3; 4.1.2; 5.4.2	
Environmental Justice	X			N/A	There are no environmental justice issues associated with the project area (BLM WFO 2002).
Floodplains	X			N/A	There are no FEMA-designated 100-year floodplains in the project area.
Invasive, Nonnative Species			X	3.4; 4.1.3; 5.4.3	
Migratory Birds			X	3.5; 4.1.4; 5.4.4	
Native American Religious Concerns		X		3.6; 4.1.5; 5.4.5	
Prime or Unique Farmlands	X			N/A	The proposed project is not located in or near any prime or unique farmlands (BLM WFO 2002).
Threatened and Endangered Species	X			3.7; 4.1.6; 5.4.6	
Wastes, Hazardous or Solid			X	3.8; 4.1.7; 5.4.7	
Water Quality (Surface and Ground)			X	3.9; 4.1.8; 5.4.8	
Wetlands and Riparian Zones			X	3.10; 4.1.9; 5.4.9	
Wild and Scenic Rivers	X			N/A	The proposed project is not located in or near any wild and scenic rivers (BLM WFO 2002).
Wilderness	X			N/A	The proposed project is located over one mile from the Augusta Mountain wilderness study area and is not in or adjacent to any wilderness area (BLM WFO 2002).

Other Resources	Not Present	Present Not Affected	Present Affected	Reference Section	Comments
Geology and Minerals			X	3.11; 4.1.10; 5.4.10	
Soils			X	3.12; 4.1.11; 5.4.11	
Vegetation			X	3.13; 4.1.12; 5.4.12	
Wildlife Resources			X	3.14; 4.1.13; 5.4.13	
Fisheries Resources	X			N/A	The proposed project is not located in or near any fisheries.
Range Resources			X	3.15; 4.1.14; 5.4.14	
Recreation			X	3.16; 4.1.15; 5.4.15	
Visual			X	3.17; 4.1.16; 5.4.16	
Social Values		X		N/A	No social values would be affected by the project.
Economic Values			X	3.18; 4.1.17; 5.4.17	
Water Quantity			X	3.9; 4.1.8; 5.4.8	
Lands and Realty			X	3.19; 4.1.18; 5.4.18	
Candidate and Special Status Species				3.20; 4.1.19; 5.4.19	

3.3 Cultural Resources

The BLM "Geothermal Resources Leasing Programmatic Environmental Assessment," completed in 2002, contains a cultural history of the BLM-WFO area (BLM WFO 2002). This EA also presented a model of high sensitivity areas for National Register of Historic Places (NRHP)-eligible cultural resource properties, which was created in order to develop a better understanding of the occurrence of significant cultural resources. The model focused on three factors associated with recorded NRHP-eligible properties: distance to permanent/semi-permanent water, elevation (as reflective of environment) and slope. An additional sensitivity for viewshed associated with historic trails was also created and mapped. No portion of the project area was identified as a high-sensitivity area for NRHP-eligible cultural resources (BLM WFO 2002).

Cultural resource surveys of the proposed well sites and access roads were conducted by the BLM WFO in March 2004 and June 2006 (Ennes 2004 and Ennes 2006), and by Kautz Environmental Consultants (KEC) in December 2006 (KEC 2007). Four isolated artifacts (two prehistoric, two historic), and four historic archaeological sites were identified (Ennes 2004 and KEC 2007).

No systemic field survey has been conducted for paleontological resources in the project area, although fossil horse, camel, fish, rhino, beaver and dogs of Miocene age have been recovered from tuffaceous sediments found in the vicinity (BLM WFO 2002).

3.4 Invasive, Nonnative Species

Invasive, nonnative species spread from infested areas by people, equipment, livestock/wildlife and the wind. They represent a legal classification in which their spread is controlled by the state. Because of their aggressive growth and lack of natural enemies, these species can be highly destructive, competitive, or difficult to control. These exotic species can reduce crop yields, destroy native plant and animal habitat, damage recreational opportunities, clog waterways, lower land values, create erosion problems, fire hazards, and poison humans and livestock. These species may proliferate to the point of crowding out other plants that benefit wildlife and domestic animals. Wildlife and grazing animals do not often eat invasive, nonnative species because their thorns, spines or chemical content make them unpalatable.

The state of Nevada lists 45 noxious weed species that require control (Nevada Administrative Code 555.10, effective 10-31-05). BLM lists eleven of these invasive nonnative species that have been inventoried and are known to occur within the Winnemucca Field Office District (BLM WFO 2002). Of these, none are specifically known to occur within the project area. However, tall whitetop (*Lepidium latifolium*), saltcedar (*Tamarix ramosissima*), Russian Knapweed (*Acroptilon repens*), and hoary cress (*Cardaria draba*) have been identified in the vicinity (Messmer 2006).

3.5 Migratory Birds

Migratory birds may be found in the project area as either seasonal residents or as migrants. Provisions of the Migratory Bird Treaty Act (16 USC 701-718h) 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. All birds in the Winnemucca Field Office district are considered neotropical migratory birds except for all the Gallinaceous birds (California quail, sage grouse, chukar partridge, gray partridge, ring-necked pheasant, mountain quail, and sharp-tailed grouse) [BLM WFO 2002].

3.6 Native American Religious Concerns

The BLM WFO initiated consultation activities with the Battle Mountain Band of the Te-Moak Tribe of the Western Shoshone (Ennes 2004), and a field visit with tribal representative(s) was conducted on June 16, 2004 (Cates 2004c). Jersey Valley hot springs is believed to have some cultural significance to the Tribe (Ennes 2004).

3.7 Threatened and Endangered Species

Pursuant to the requirements of Section 7(c) of the Endangered Species Act of 1973, as amended, for federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) concerning species listed under the Act, and consistent with the applicable general stipulation attached to the leases (Appendix A, Appendix B, and Appendix C), on May 24, 2006 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 June 12, 2006 that, to the best of its knowledge, no listed, proposed or candidate species existed in the project area (U.S. Fish and Wildlife Service 2006) (see Appendix D).

3.8 Wastes, Hazardous or Solid

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 (Gingrich 2006). There are no farms or ranches in the project area that could use bulk quantities of fuel, fertilizers or pesticides (Gingrich 2006). The transport and handling of hazardous materials in Nevada are subject to numerous federal and state laws and regulations.

3.9 Water Quality (Surface and Ground) and Water Quantity

The project area is located in the Jersey Valley Hydrographic Area (Number 132 of 232 in the State of Nevada) of the Central Hydrographic Region (Number 10 of 14 in the State of Nevada), which is by far the largest hydrographic region in Nevada at nearly 30 million acres (NDCNR-DWR 2004). The Jersey Valley Hydrographic Area is relatively small, only 0.3 percent (about 91,000 acres) of the Central Region. The NDCNR-DWR map of static groundwater level in Nevada lists the depth to groundwater in the hydrographic area as greater than 100 feet (NDCNR-DWR 1974).

Any surface water runoff from the project area would flow southwest, terminating eventually in the adjacent Dixie Valley Hydrographic Area (Number 128), approximately 40 miles to the southwest. Both the Jersey Valley and Dixie Valley Hydrographic Areas are “designated” areas or groundwater basins, which are basins designated by the Nevada State Engineer, Division of Water Resources, Department of Conservation and Natural Resources (NDCNR-DWR), when permitted ground water rights approach or exceed the estimated average annual recharge and the water resources are being depleted or require additional administration (NDCNR-DWR 2004). The Nevada State Engineer has additional authority in the administration of the water resources within a designated groundwater basin.

The stream channels which flow roughly west through the project area in the vicinity of the Proposed Action are likely ephemeral (flowing only during or immediately after rainfall), although some may be classified as intermittent (flowing part of the year, but dry the rest of the year). On April 16, 2004, EMA observed a small amount of water flowing in a channel across the eastern

access road southwest of well site 18-27, but no other surface water flow was noted in any other channels in the project area.

The U.S. Geological Survey 7.5 minute topographic maps of the area (Home Station Ranch Quadrangle 1990 and Mt. Moses Quadrangle 1990) shows three springs within the project area, although the U.S. Geological Survey 30 X 60 minute topographic map (Fish Creek Mountains 1982) shows a fourth spring, which has been added to Figure 2. The easternmost spring is located on private land in the NW¼SW¼ of Section 34. The westernmost spring is located on public land in the center of Section 29. The other two springs, located in the center of the project area in the SW¼SW¼ of Section 28 and the SE¼SE¼ of Section 29, respectively, have been singly and collectively referred to as Jersey Hot Springs. These springs have temperatures reported at 29°C to 57°C (84°F to 135°F) (NBMG 2004).

3.10 Wetlands and Riparian Zones

A pond of several acres, located west of Jersey Valley Road near the southeast corner of Section 29, was observed from the road. It is reported that this pond, and the water-dependent vegetation surrounding it, are supported by water flowing from the thermal spring located in the SE1/4SE1/4 of Section 29 (Cates 2004c).

3.11 Geology and Minerals

There are no known geologic hazards which could adversely affect the Proposed Action within the project area (BLM WFO 2002).

The project area lies immediately west of the small Jersey Valley-Rex group of mines (also known as the Murphy Mine), which mined and shipped principally silver and lead ore (as well as zinc, copper and gold ores) from 1880 to about 1929 (NBMG 1985). There are 161 active mining claims on the public lands within the project area (BLM 2006). There are no known deposits of salable minerals within the project area (Cates 2004b).

The project area lies within the Prospectively Valuable Area (PVA) 13 and was analyzed in the 2002 Geothermal Leasing EA. This area is considered to contain moderate to high temperature geothermal resources at depth (BLM WFO 2002).

3.12 Soils

Soil types in the project area were identified using the 1994 “Pershing County East Part” soil survey by the National Resources Conservation Service (NRCS). Four soil units exist within the project area, but surface disturbing activities would occur entirely within soil unit 662. This soil unit is comprised of the Oxcorel-Whirlo-Trocken Variant association (Zielinski 2004 and 2006). The Oxcorel soil has very slow permeability, medium runoff potential, and a slight erosion hazard by water and wind. The Whirlo and Trocken Variant soils have moderately rapid permeability, medium runoff potential, and a slight erosion hazard by water and wind.

3.13 Vegetation

All surface-disturbing activities from the project would occur in the areas identified as shadscale plant community (Zielinski 2006). See also the discussions of invasive, nonnative species and special status plant species in Section 3.4 and Section 3.7, respectively.

3.14 Wildlife Resources

No unique or sensitive wildlife habitat is known to occur in the project area. Bats are located in the nearby Murphy Mine, immediately east of the Project area.

3.15 Range Resources

The project area is located in the Buffalo Valley Allotment. This allotment comprises approximately 379,172 acres and authorizes approximately 16,218 animal unit months (AUMs) annually. An AUM is the amount of forage needed to sustain one cow, five sheep, or five goats for a month. Within this allotment, one AUM is equal to approximately 23 acres (Clarke 2006).

3.16 Recreation

Known dispersed recreational use is evidenced in the soaking facility constructed downstream of the hot springs in the southwest corner of Section 29. The nearest proposed well site, 86-29, is approximately 0.25 miles away.

3.17 Visual Resources

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 project area is located in a VRM Class IV area (Cates 2004a). The objective of Class IV is to provide for management activities that require major modification of the existing landscape character. 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).

The project area is located in relatively flat terrain at the base of the Fish Creek Mountains. Viewed from the County Road the project area consists of a relatively flat foreground with spotty vegetation and a smooth texture. The mid-ground has a prominent horizontal line, presumably a fault scarp, where the base of the mountains meets the upper edge of the valley. In the background the mountains rise abruptly and form rounded pyramidal shapes, with accompanying diagonal lines. The background mountain slopes are dotted with juniper trees that are dark green.

3.18 Economic Values

The closest population center to the project area is Battle Mountain, in Lander County. Adjacent population centers/counties are Lovelock, in Pershing County and Winnemucca, in Humboldt County. Pertinent economic values are provided in Table 4.

Table 4: Economic Values Data

	Total Population	Housing			Labor	
		Housing Units	Occupied (%)	Median Value ($) of owner-occupied	Labor Force	Leading Employers
Pershing County (U.S. Census Bureau 2006a)	6,693	2,389	82.1	82,200	2,478	• Management, professional and related industries (22.7%) • Service occupation (19.9%) • Sales and office industry (18.9%)
Lovelock (U.S. Census Bureau 2006b)	2,003	957	81.8	81,700	917	• Service occupation (25.9%) • Management, professional and related industries (23.2%) • Production, transportation, and material moving occupations (19.9%)
Lander County (U.S. Census Bureau 2006c)	5,794	2,780	75.3	82,400	2,741	• Management, professional and related industries (24.4%) • Construction, extraction, and maintenance occupations (21.7%) • Production, transportation, and material moving occupations (19.1%)
Battle Mountain Census Data Place (CDP) (U.S. Census Bureau 2006d)	2,871	1,411	74.6	79,600	1,473	• Management, professional and related industries (22.1%) • Construction, extraction, and maintenance occupations (20.1%) • Production, transportation, and material moving occupations (19.9%)
Humboldt County (U.S. Census Bureau 2005a)	16,106	6,594	83	117,400	7,653	• Management, professional and related industries (25.7%) • Sales and office industry (21.7%) • Construction, extraction, and maintenance occupations (20.5%)
Winnemucca (U.S. Census Bureau 2005b)	7,174	3,319	85	124,000	4,586	• Management, professional and related industries (30.4%) • Sales and office industry (25.0%) • Construction, extraction, and maintenance occupations (14.9%)

3.19 Lands and Realty

Several rights-of-way or other authorizations have been granted on the public lands within the project area. These include rights-of-way for several fences, a pipeline, the Jersey Valley Road through the middle of the project area, and a public water reserve (PWR 107) in the southeastern-most corner of Section 29.

3.20 Candidate and Special Status Species

A Sensitive Taxa Record Search compiled by the Nevada Natural Heritage Program (NNHP) in April 2006 at the request of EMA identified no sensitive taxa recorded within the project area. The NNHP search report stated that habitat may be available for the following species: the Lahontan beardtongue (*Penstemon palmeri var. macranthus*), a Nevada BLM sensitive species; and the Reese River phacelia (*Phacelia glaberrima*), a taxon determined to be Vulnerable by the NNHP (NNHP 2006). The NNHP provides the following information about the habitats for these species (see Table 5):

Table 5: Special Status Species – NNHP Information

Species	**Habitat**
Lahontan beardtongue: (*Penstemon palmeri var. macranthus*)	Habitat occurs along washes, roadsides and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer.
Reese River phacelia: (*Phacelia glaberrima*)	Habitat occurs on open, dry to moist, alkaline, nearly barren, sometimes scree-covered, whitish to brownish shrink-swell clay soils derived from fluviolacustrine volcanic ash and tuff deposits, generally on the steeper slopes of low hills, bluffs, and badlands in the shadscale-greasewood, sagebrush and lower pinyon-juniper zones with *Atriplex confertifolia, A. canescens, Artemisia tridentata, Sarcobatus vermiculatus, Tetradymia, Phacelia gymnoclada, Cleomella*, etc.

Source: (NNHP 2001)

None of the identified special status plant habitats appear to occur in the areas proposed for disturbance within the project area. The BLM was also contacted and requested to furnish information on special status species with the potential to occur in the project area. The following list identifies special status wildlife species observed by Battle Mountain Field Office personnel in the general area of the Proposed Action (Crimmins 2004):

Mammals

Antrozous pallidus	pallid bat
Brachylagus idahoenis	pygmy rabbit
Corynorhinus townsendii	Townsend's big-eared bat
Ovis Canadensis nelsoni	desert bighorn sheep

Birds	
Agelaius tricolor	Tricolored Blackbird
Aquila chrysaetos	Golden Eagle
Athene cunicularia	Burrowing owl
Buteo regalis	Ferruginous Hawk
Buteo swainsoni	Swainson's Hawk
Centrocecus urophasianus	Greater Sage Grouse
Falco mexicanus	Prairie Falcon
Falco peregrinus	Peregrine falcon
Lanius ludovicianus	Loggerhead Shrike
Numenius americanus	Long-billed Curlew

Of the above species, the desert bighorn sheep and pygmy rabbit were eliminated from further analysis in this EA as the project area does not provide suitable habitat for these species.

The pallid and Townsend's big eared bat use natural caves and cracks in rock outcrops or man-made cavities for breeding, rearing, and/or hibernating habitat. There is a major bat maternity colony and hibernaculum located within one mile of one of the proposed drill sites (Stamm 2004, Covert 2006). These bats also use some of the mine adits located in Sections 27 and 34 in T27N, R40E on the east side of lease NVN-77483.

Sage grouse are upland game birds found on the sage-steppe habitats throughout the West, primarily in areas dominated by sagebrush (Artemesia spp.), forbs, and grasses. Optimum sage grouse habitats are generally characterized as mature sagebrush stands with dense understory of native perennial grasses and native forbs. Sage grouse have been found to require a diversity of habitats for wintering, breeding, nesting, and brood rearing. Wintering sage grouse utilize medium to tall sagebrush communities (25-80cm) on south and west facing slopes. Breeding leks are typically located in sparsely vegetated areas. Nests are located under sagebrush plants often in mountain sagebrush habitats but bitterbrush and rabbitbrush sites may also be utilized. Brood rearing habitats are typically found where forb abundance is greatest (Crawford et. al. 2004).

The project area does provide some foraging opportunities for the other identified special status bird species. It is not known whether any special status invertebrate species occur within the hot (or warm) springs found in the project area.

4 ENVIRONMENTAL CONSEQUENCES

4.1 Proposed Action

4.1.1 Air Quality

Fugitive dust would be generated from earth-moving activities and travel on unpaved roads during drill pad and road construction and drilling activities. Based on implementation of environmental protection measures specified by Ormat, water would be applied to the ground during the construction and utilization of the drill pads and access roads as necessary to control dust (see Section 2.1.8). The NDEP-BAPC also requires that an application for a Surface Area Disturbance Permit, documenting the areas of proposed disturbance and the best practical dust control methods to be use, be submitted if the actual amount of surface disturbed by the project would be greater than 5 acres. The dust which could be generated when drilling with air would be controlled by a separator/muffler, and only the air and water vapor would be discharged to the air.

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 drill pad and road construction and drilling activities from the diesel engines used.

There is little chance that drilling in these moderate temperature geothermal reservoirs would encounter substantial hydrogen sulfide gas. The BOPE would be in place to shut off any unexpected gas flows, and any substantial concentrations of hydrogen sulfide would be treated and removed using caustic soda, caustic soda and peroxide or other standard hydrogen sulfide abatement technology as appropriate.

No residual air quality impacts are expected.

4.1.2 Cultural Resources

Four isolated artifacts (two prehistoric, two historic) and four historic archaeological sites were identified during the field surveys. The sites included two refuse scatters and two road segments. The isolated artifacts, and three of the archaeological sites, are recommended as non-significant, and not eligible for nomination to the National Register of Historic Places (NRHP). One of the archaeological sites is a portion of the historic “Main Road to Jersey Valley,” which in its entirety is recommended as significant, and eligible for nomination to the NRHP. However, the segment of this road within the current project area is recommended as a non-contributing element to the significance of the site regarded as a whole (KEC 2007).

Surface-disturbing activities to be undertaken as part of the Proposed Action would occur in areas covered by soil, and would not entail substantial grading, so the project is expected to have no adverse impact on paleontological resources.

4.1.3 Invasive, Nonnative Species

Project activities could contribute to the spread of invasive, nonnative species within the project area through the proposed surface disturbing activities and the number of construction and drilling vehicles involved. Ormat will comply with special lease stipulations requiring that seed

mixtures used to re-vegetate disturbed areas be “weed free” and that an invasive, nonnative species control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List be implemented. However, project construction equipment could bring invasive, nonnative plant propagules into the project area. The following mitigation measure is recommended to decrease the potential for the spread of invasive, nonnative plant species into the project area on project construction equipment.

Mitigation Measure:

For a period of three years following the commencement of construction, project sites shall be inventoried by the lessee for the presence of invasive, nonnative species. Inventory data shall be reported to the BLM WFO project Lead within one week of receipt by the lessee. The area shall be treated with BLM certified pesticides following BLM approval of a pesticide use proposal if species are present.

Following the three year period, periodic inventory for the presence of invasive nonnative species would be performed at project sites, with treatment occurring as necessary. The periodic inventory and treatment would occur for as long as the lessee is present at the site.

Following the implementation of these mitigation measures, there would still be some potential for the spread of invasive, nonnative species within the project area, which would be a residual impact.

4.1.4 Migratory Birds

Ormat will comply with special lease stipulations to conduct inventories for migratory bird nests and limit ground disturbing activities if conducted during the migratory bird-nesting season (see Appendix A, Appendix B, and Appendix C). Implementation of this measure would avoid the potential for violation of the Migratory Bird Treaty Act.

Project construction (regardless of the season constructed) could result in the direct loss of up to 9.61 acres of potential migratory bird habitat. This project is temporary and short-term. Migratory birds would adjust and relocate to abundant similar habitat in the 5,060-acre project area and beyond.

Project-generated construction and drilling noise (estimated at an average 83 decibels (dBA) at a distance of 50 feet) could also keep some migratory birds away from areas generating this noise (typically areas of new surface disturbance). Other adverse indirect effects could result from general human activity, which could displace individuals or reduce breeding success of species that are sensitive to human activity. The indirect effects would be temporary and short-term. In addition, migratory birds would be able to re-occupy the disturbed areas upon completion of these short-term operations, which would prevent residual impacts.

4.1.5 Native American Religious Concerns

As all project activities are located at least 1,000 feet away from the springs; the project would not affect either the quality or quantity of the springs; and the project is short-term and temporary, it is anticipated that the project would not affect the cultural significance of the springs.

4.1.6 Threatened and Endangered Species

There will be no impacts to threatened and endangered species as none are known to exist within the project area.

4.1.7 Wastes, Hazardous and Solid

Diesel fuel, lubricants, hydraulic fluids and drilling chemicals (drilling mud, caustic soda, barite, etc.), would be transported to, stored on and used by the project at the proposed drill sites (see Table 6). The project must conform to both federal and state requirements for handling these hazardous materials. Typical of most construction projects, the storage and use of these materials may result in minor, incidental spills of diesel fuel or oil to the ground during fueling of equipment, filling of fuel storage tanks, and handling lubricants. The project includes the development of a hazardous material spill and disposal contingency plan which would describe the methods for cleanup and abatement of any petroleum hydrocarbon or other hazardous material spill.

Table 6: Materials and Chemicals Commonly Used During Well Drilling

Product	**Quantity Used**	**Quantity Stored**
Drilling Mud Gel (Bentonite Clay)	200,000 lbs	100 lb sacks on pallets
Salt (NaCl)	80,000 lbs	50 lb sacks on pallets
Barite (BaSO4)	12,000 lbs	50 lb sacks on pallets
Tannathin (Lignite)	2,500 lbs	50 lb sacks on pallets
Lime (Calcium Hydroxide)	2,000 lbs	50 lb sacks on pallets
Caustic Soda (Sodium Hydroxide)	1,000 lbs	50 lb sacks on pallets
Diesel Fuel	30,000 gals	6,000 gal tank
Lubricants (Motor Oil, Compressor Oil)	1,000 gals	55 gal drums
Hydraulic fluid	200 gals	55 gal drums
Anti-Freeze (Ethylene Glycol)	100 gals	55 gal drums
Liquid Polymer Emulsion (partially hydrolyzed polyacrylamide / polyacrylate (PHPA) copolymer)	100 gals	5 gal buckets

Well workover operations may involve placing a dilute mixture of hydrochloric (muriatic) and hydrofluoric acids down the well. The amount of dilute acid placed in the well bore (which can vary from 10,000 gallons to 50,000 gallons or more) is determined by calculating the amount of each type of mineral to be dissolved. Concentrated (35%) hydrochloric acid and 40% ammonium fluoride solution (to make the hydrofluoric acid) are trucked to the site and mixed on site with water by experienced contractors. The dilute acid mixture is placed in the cased well bore, followed by water to push the mixture into the geothermal reservoir. After dissolving the minerals in the geothermal reservoir, the water and now spent acids are flowed back through the well to the surface where they tested, neutralized if necessary (using sodium hydroxide or crushed limestone or marble), and discharged to the reserve pit.

The project must 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.

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. 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 project would be transported offsite to an appropriate landfill facility. Portable chemical toilet wastes would be removed by a local contractor. Given Ormat’s compliance with the associated lease stipulations, no effects would result from solid wastes generated by the project. The disposal of these wastes would be a residual impact of the project.

4.1.8 Water Quality (Surface and Ground) and Water Quantity

The project would have little potential for adversely affecting the quality of either surface waters or ground waters in the project area because:

- Each slim well and full-size exploration well would be cased with steel casing cemented into the ground which is designed to prevent contamination of any ground waters by the drilling, workover and geothermal fluids and prevent the loss of any geothermal resource into other aquifers.
- In addition to steel casing, each slim well and full-size exploration well will be drilled using non-toxic drilling mud, lost circulation materials, and other mud additives to prevent the loss of drilling fluids into the rock.
- Any injection test conducted on a slim or full-size exploration well would only inject produced geothermal fluid through the cased well back into the geothermal reservoir from which it was produced, ensuring that there would be no affect on the quality of ground waters. Chemical analyses of the produced geothermal fluid would be conducted to characterize the geothermal fluids.
- Each slim well and full-size exploration well would be drilled using non-toxic drilling mud to prevent loss of drilling fluids into the rock.
- Reserve pits would be constructed at each site for the containment and temporary storage of drilling mud, drill cuttings, geothermal and workover fluids and storm water runoff from the constructed well pad.
- Storm water runoff from undisturbed areas around the constructed well pads would be directed into ditches surrounding the well pad and back onto undisturbed ground consistent with best management practices for storm water.
- To minimize erosion from storm water runoff, access roads would be constructed and maintained consistent with the best management practices for road construction applicable to temporary roads (see Appendix E).

The following mitigation measures are recommended to ensure that the construction, improvement or reclamation of project roads is properly conducted to minimize erosion, sedimentation or soil loss and that sufficient freeboard is maintained in the reserve pit to prevent overtopping and subsequent erosion and sedimentation.

Mitigation Measure:

Roads to be constructed, improved or reclaimed as part of the project would be reviewed by the BLM and required to conform to the requirements of BLM Manual 9113 and the "Gold Book" ("Oil and Gas Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development"), as applicable to the intended project use.

Mitigation Measure:

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

The project would also have no effect on the quantity of either surface waters or ground waters in the area if the relatively small amount of water, averaging approximately 30,000 gallons (about 0.09 acre-feet) per day for the exploration well drilling, is obtained from local ranchers. If this water is obtained from a temporary water well (see Section 2.1.4), no effects on shallow ground waters are anticipated as there are no fresh water springs in the project area or vicinity. No effects to the thermal springs from production of the temporary water well are anticipated, and monitoring to identify any effects would be conducted, pursuant to the mitigation measure below.

Special lease stipulations require institution of a hydrologic monitoring program once exploration activities commence; the details of which are to be site specific and the intensity commensurate with the level of exploration (Appendix A, Appendix B, and Appendix C). The following mitigation measures detail the monitoring to be implemented. There would be no residual impacts to either surface or ground waters.

Mitigation Measures:

Lessee shall monitor and collect the following hydrologic data from each of the two springs known as the Jersey Valley Hot Springs, which are located in the SW¼SW¼ of Section 28 and the SE¼SE¼ of Section 29, respectively:

- **Representative temperature, flow or stage, and basic thermal water chemistry – once immediately prior to the commencement of drilling and once immediately following the completion of drilling;**
- **During the drilling or flow testing of slim or full-size well 86-29 or when extracting water from the groundwater well – Representative temperature and flow or stage – once each week until drilling, flow testing or water extracting is completed;**
- **Each year following the drilling of the first well until all wells have been abandoned – Representative temperature, flow or stage, and basic thermal water chemistry – once per year.**

Collected data shall be reported to the BLM Winnemucca Field Office project Lead and Hydrologist in written form within one week of receipt by the lessee.

Lessee shall document available information regarding fresh water aquifers which may be encountered during drilling, including the number encountered, their depths and saturated thickness, their quality, and any other properties.

4.1.9 Wetlands and Riparian Zones

The Proposed Action is not expected to affect any riparian or wetland areas because it would not affect the quality or quantity of any ground or surface waters within the project area and

because all proposed project activities are located at least 1,000 feet away from any known spring or pond which may support riparian or wetland habitat. This distance exceeds the “no surface occupancy” distance of 650 feet from any “surface water bodies, riparian areas, wetlands, playas or 100-year floodplains” required in the general stipulations (Appendix A, Appendix B, and Appendix C).

4.1.10 Geology and Minerals

There is the potential for simultaneous use of the project area by both Ormat and the locatable mineral claimants. There would be no residual impacts.

4.1.11 Soils

The project could disturb up to 9.61 acres. The potential for water and wind erosion on the disturbed soils in the project area is slight. As part of the project, disturbed areas would be re-contoured as necessary and reclaimed in accordance with applicable BLM requirements.

Soil productivity would be reduced in the 9.61 acres to be disturbed, but due to the temporary nature of this disturbance and the commitment to reclaim the disturbed lands, project impacts on soil productivity are low. The following mitigation measure is proposed to enhance the recovery of soil productivity on disturbed areas.

Mitigation Measure:

A minimum 12 inches of topsoil should be salvaged during construction and stockpiled for use during subsequent reclamation of the disturbed areas.

Following implementation of this mitigation measure there should be no residual impacts to soils.

4.1.12 Vegetation

All surface-disturbing activities from the project would result in the loss of up to 9.61 acres of this common plant community. See also the discussions of invasive, nonnative species and special status plant species in Sections 3.4 and 3.7, respectively. Disturbed areas could have an increase in cheatgrass as compared to non-disturbed areas.

As part of the project, disturbed areas would be reclaimed in accordance with applicable BLM requirements. The following mitigation measure is recommended to seed disturbed areas with seed mixtures and minimize the spread of invasive, nonnative species.

Mitigation Measure:

Seeding of disturbed areas would be completed using the following native seed mixture and application rate. Any variance in the mix would be coordinated first with the BLM Winnemucca Field Office.

Table 7: BLM-Recommended Seed Mix

Species	PLS LBS./Acre	Bulk LBS./Acre	PLS/sq. ft.
Sandberg bluegrass	**1.90**	**2.00**	**38**
Fourwing saltbush	**3.00**	**5.00**	**4**
Shadscale	**3.00**	**5.00**	**4**
Indian ricegrass	**1.00**	**1.25**	**4**
Totals	**8.90**	**13.25**	**50**

PLS = Pure Live Seeds

Following the implementation of this mitigation measure, there should be no residual impacts to vegetation.

4.1.13 Wildlife Resources

The project would result in the loss of up to 9.61 acres of wildlife habitat. The direct displacement of wildlife would result from the surface disturbance required for construction of the drilling pads and access roads. A slight reduction in wildlife carrying capacity would be expected to occur for some species, but most wildlife would be expected to adjust and relocate to similar habitat that is abundant in the project vicinity. Over time and subsequent to site reclamation, habitat would be restored. This project is short-term and temporary, and there is an abundance of comparable habitat in the area.

Project-generated noise could also keep some animals away from areas directly affected by surface disturbance during the on-site project construction and drilling activities. Other adverse indirect effects could result from general human activity, which could displace individuals or reduce breeding success of species that are sensitive to human activity. The indirect effects would be temporary and short-term. In addition, wildlife would be able to re-occupy the disturbed areas upon completion of these short-term operations. There should be no residual impacts to wildlife resources.

4.1.14 Range Resources

This project could disturb up to 9.61 acres, or less than one percent of the 379,172 acres within the allotment, and reduce the 16,218 AUMs within the allotment by less than 1 AUM. All project activities are located away from sources of water in the vicinity and will not prevent livestock access to the available sources of water in the area. There should be no residual impacts to range resources from the project.

4.1.15 Recreation

Project operations should not adversely affect the ability of recreational users to either access or utilize the hot springs as there would be no affect on the quality or quantity of the surface or ground waters in the area (see Section 4.1.8) or the surrounding environment.

Air quality impacts to recreation users could include dust from vehicle traffic on unpaved roads and exhaust from construction vehicles. As discussed in Section 4.1.1, these would be short-term and temporary. Ormat has also stated that 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 (see Section 2.1.8).

Project-generated noise and traffic could cause some recreational users of the project area to stay away during the project construction and drilling activities. These indirect effects would be temporary and short-term. The project should have no residual impacts on recreation.

4.1.16 Visual Resources

The total estimated area of new surface disturbance required for construction of the drilling pads and access roads would be 9.61 acres. Construction would require little cut or fill because the existing surface is relatively level, and re-contouring as necessary and reclamation of the pads and access roads when no longer needed has been adopted as part of the Proposed Action. During the approximately fifteen-day drilling process for each slim well, the top of the drill rig derrick would be between 30 and 70 feet above the ground surface (depending on the drill rig used). During the approximately 45-day drilling process for each full-size exploration well, the top of the drill rig derrick would be approximately 160 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.

The Proposed Action would be consistent with the Class IV VRM classification of the area. The drill sites are all located in relatively flat terrain. Therefore, the impacts to visual resources would be temporary and would primarily affect form, line, and color. To further reduce visual impacts the following mitigation measures have been proposed.

Mitigation Measure

Wellhead equipment left on the drill site following the completion of drilling would be painted a color, subject to approval by the authorized officer, which would blend with the landscape. Prior to paint selection, Ormat would contact the Winnemucca Field Office project lead.

All drill rig and well test facility lights would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.

4.1.17 Economic Values

The construction/drilling workforce is expected to consist of up to 6 workers for the exploration slim well drilling and up to 18 workers for the exploration well drilling and testing. Drilling of each slim well and exploration well facility is anticipated to require approximately 15 days and 45 days, respectively. Some of these workers would 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 these short-term construction/drilling assignments. Therefore, most are expected to stay in local hotels or rental housing units.

The project is short-term and temporary, and would not induce any population growth in an area. Neither does the project create or provide any infrastructure which would indirectly induce substantial population growth.

Non-local construction/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 RV campground space rent, restaurants, groceries, gasoline, and entertainment. In addition, Ormat likely would purchase or 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. This

spending activity associated with the project construction and drilling would have a small but positive effect on local businesses in Lander, Humboldt, or Pershing County.

4.1.18 Lands and Realty

The federal geothermal leases to be explored as part of the Proposed Action include a general stipulation which prohibits “drilling, including exploration or development activities, within linear rights-of-way” (Appendix A, Appendix B, and Appendix C). Other than the use of Jersey Valley Road (which passes through the public water reserve) for access to the project area, two of the proposed drill sites and site access roads, the Proposed Action includes no drilling or other exploration activities within any of these rights-of-way or the public water reserve.

4.1.19 Candidate and Special Status Species

To protect those bats which use the mine adits located in Sections 27 and 34 in T27N, R40E (on the east side of lease NVN-77483), lease NV-77483 applies a “no surface occupancy” restriction to lands within 0.25 mile of these mine adits. No activities proposed by the project would occur within 0.25 mile of these adits.

The Proposed Action is unlikely to effect the pallid bat or Townsend’s big eared bat due to the short-term, temporary nature of the project; the absence of any drilling materials or produced waters on-site which could harm the bats; and the distance from the areas of surface disturbance to the maternity colony and hibernaculum. Lights used for drilling at night may attract and concentrate moths and other insects on which the Townsend’s big eared bat, and potentially the pallid bat, may feed, which could be a short-term beneficial effect.

Given the marginal sage grouse habitat and absence of leks in the vicinity of the project area, the project will not likely have effects on this species.

Project construction would result in the direct loss of approximately 9.61 acres of potential special status bird habitat. This project is temporary and short-term and any special status birds would likely adjust and relocate to abundant similar habitat in the project vicinity.

The general lease stipulations (Appendix A, Appendix B, and Appendix C) require that a survey for invertebrates be conducted in areas of geothermal surface expression (typically warm or hot springs) prior to development. Because the proposed project is limited to exploration (not development) activities, and these activities do not have the potential to adversely affect the quality or quantity of either surface waters or ground waters (including cold water or geothermal springs) in the area (as discussed in Section 3.4), this invertebrate survey is not necessary at this time.

4.2 The No Action Alternative

No activities would be undertaken if the No Action Alternative were selected. There would be no effects on air quality; cultural resources; invasive, nonnative species; migratory birds; Native American religious or traditional resources, special status species; wastes (hazardous or solid); water quality (surface and ground); wetlands and riparian zones; geology and minerals; soils; vegetation; wildlife; range resources; recreation; visual; water quantity; and lands and realty from implementation of the No Action Alternative.

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 which, together with the project, may incrementally impact the environment, and addresses the potential cumulative impacts of these actions and the project.

5.1 Cumulative Impacts Assessment Area

The cumulative impact assessment area for this environmental assessment is the Jersey Valley Hydrographic Area (Number 132) 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) (see Figure 8).

5.2 Past and Present Actions

Past and present activities consist principally of dispersed recreation, livestock grazing, and mineral activities (including geothermal and hard rock mining). A mining notice of intent (NOI) was submitted on August 4, 2004 by Geologix (U.S.), Inc. proposing exploration activities on mining claims located in the Fish Creek Mountains in Pershing and Lander Counties, which lie east of, and partially overlap the eastern portion of, the project area (see Figure 8). As of the latest NOI Amendment dated February 17, 2006, 18 of 32 holes have been drilled, creating approximately 4.6 acres of surface disturbance, 3.5 acres of which have been reclaimed. Geologix has completed its 2006 exploration efforts and does not anticipate any additional exploration work. Reclamation work on the existing drill pads, sumps and access roads is pending (Loptien 2006).

5.3 Reasonable Foreseeable Future Actions

For this analysis it is assumed that the "foreseeable future" is the anticipated four-year period for implementation of the Proposed Action plus a subsequent three-year period for reclamation. It is assumed that recreational, locatable minerals exploration, and livestock grazing activities associated with the cumulative impact assessment area would continue into the reasonable foreseeable future in the same manner and to the same degree as they have been conducted in the present and recent past.

5.4 Cumulative Impacts for the Proposed Action

5.4.1 Air Quality

Fugitive dust could be generated from any surface-disturbing activities and travel on unpaved roads. The operation of diesel engines could 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).

5.4.2 Cultural Resources

Most impacts to cultural resources could be prevented through the Section 106 process of the National Historic Preservation Act. Impacts to the integrity of setting of any subsequently identified National Register listed/eligible sites where integrity of setting is critical to their listing/eligibility could occur from additional road construction and mineral exploration. Roads could increase the likelihood of vandalism and illegal collecting/excavation of cultural sites. Mitigation measure(s) requiring surveys for cultural resources prior to surface disturbing activities could help reduce the potential adverse impacts to cultural resources, if implemented for the other actions.

5.4.3 Invasive, Nonnative Species

Past and present actions may have introduced and contributed to the spread of invasive, nonnative species within the area of cumulative effect, and the same may be expected from the reasonable foreseeable future actions. Mitigation measure(s) to inventory and treat newly disturbed areas could help reduce the potential adverse effects if also implemented for the other actions.

5.4.4 Migratory Birds

The amount of surface disturbance which may be created within the cumulative impact area by road construction and mineral exploration operations would be a very small portion of the cumulative impact area. Mitigation measure(s) requiring inventories for migratory bird nests and limiting ground disturbing activities if conducted during the migratory bird nesting season, could help reduce the potential adverse effects if also implemented for the other actions.

5.4.5 Native American Religious Concerns

Although no Native American concerns for the area of cumulative impact have yet been identified, consultation should be undertaken for each of the other actions.

5.4.6 Threatened and 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.

5.4.7 Wastes, Hazardous or Solid

The transportation, use, storage and disposal of hazardous materials and wastes are subject to numerous federal, state and local laws and regulations. These requirements are intended to protect the public and the environment and are applicable to each and all of these foreseeable future actions. Hazardous materials similar to those used by the project are expected to be used by the projects anticipated within the cumulative impact assessment area, including petroleum hydrocarbon fuels (principally diesel fuel), hydraulic fluid, lubricants and drilling chemicals and materials.

5.4.8 Water Quality (Surface and Ground) and Water Quantity

Storm water runoff from mineral exploration activities could create additional erosion and sedimentation.

5.4.9 Wetlands and Riparian Zones

Additional recreation, grazing and mineral exploration activities are not expected to directly affect any riparian or wetland areas, although erosion from mineral exploration activities storm water runoff could indirectly affect wetlands and riparian zones through sedimentation.

5.4.10 Geology and Minerals

Because of the length of time involved, there is a greater potential for the simultaneous use of the project area by both Ormat and the locatable mineral claimants.

5.4.11 Soils

Additional impacts to soils could be expected to occur from additional mineral exploration and other cumulative activities. Additional roads could be constructed and mineral exploration holes drilled. These activities could disturb the soils in the affected areas, which would be “lost” until reclaimed following completion of the projects. Mitigation measure(s) requiring the salvaging of topsoil could help reduce the potential adverse effects if implemented for the other actions.

5.4.12 Vegetation

Additional impacts to vegetation could also be expected to occur from additional mineral exploration and other cumulative activities. Each of these activities could disturb and/or remove vegetation in the affected areas. Mitigation measure(s) requiring timely reclamation and re-seeding of disturbed areas, as proposed by the project, could reduce adverse impacts to vegetation.

5.4.13 Wildlife

Additional wildlife habitat could be disturbed by the additional mineral exploration and other cumulative activities through the creation of roads and mineral exploration holes. Wildlife habitat directly disturbed by these activities would be “lost” until reclaimed. General human activity and generated noise could also keep some animals away from habitat not directly affected by surface disturbance. The amount of this direct and indirect surface disturbance expected from the cumulative projects is a small portion of the cumulative impact assessment area. There is abundant comparable wildlife habitat in the vicinity and region, and wildlife is normally able to move away from small areas of direct disturbance and into adjacent suitable habitat. Reclamation of directly disturbed areas, as proposed by the project, could re-establish habitat for wildlife.

5.4.14 Range Resources

All of the past, present, and reasonable foreseeable future actions would be located within the South Buffalo Valley allotment. These actions could create additional, though small, reductions in grazing through the loss of forage from surface disturbance. Some of this reduction in forage would be temporary, until reclaimed. No cumulative activities are expected to prevent livestock access to available sources of water in the area.

5.4.15 Recreation

None of cumulative activities would prevent continued access by recreational users to either access or utilize the hot springs on the public lands within the cumulative impact assessment area. Potential effects on recreation could be dependant upon the changes to the springs.

Fugitive dust from vehicle traffic on unpaved roads, as well as noise and traffic from cumulative activities, could cause some recreational users to avoid those active portions of the area during the construction and drilling activities. These indirect effects would be temporary and short-term.

5.4.16 Visual Resources

Public lands within the cumulative impact assessment area are rated as VRM Class IV (modification), like the project area. Few man-made features are visible within this cumulative impact assessment area, and all are consistent with the VRM Class IV rating. Continued mineral exploration and the construction of roads could result in modifications to the line, form, color, and texture of the characteristic landscape. Roads create strong horizontal linear contrasts. Vegetation and soil removal create color, textural, and linear contrasts with adjacent areas that could be visible long after all the drilling facilities were removed.

5.4.17 Economic Values

Beneficial economic impacts could be expected from the mineral exploration operations. Some of the construction work could likely be contracted out to local contractors and builders, and some of the required supplies and construction materials could also be purchased from local merchants. Some positive impacts could also be realized from the rental of hotel rooms and purchase of meals and entertainment by construction workers.

5.4.18 Lands and Realty

Granting of new rights-of-way for non-geothermal development would need to take into consideration existing geothermal leases. No other impacts to land use or realty are expected to occur.

5.4.19 Special Status Species

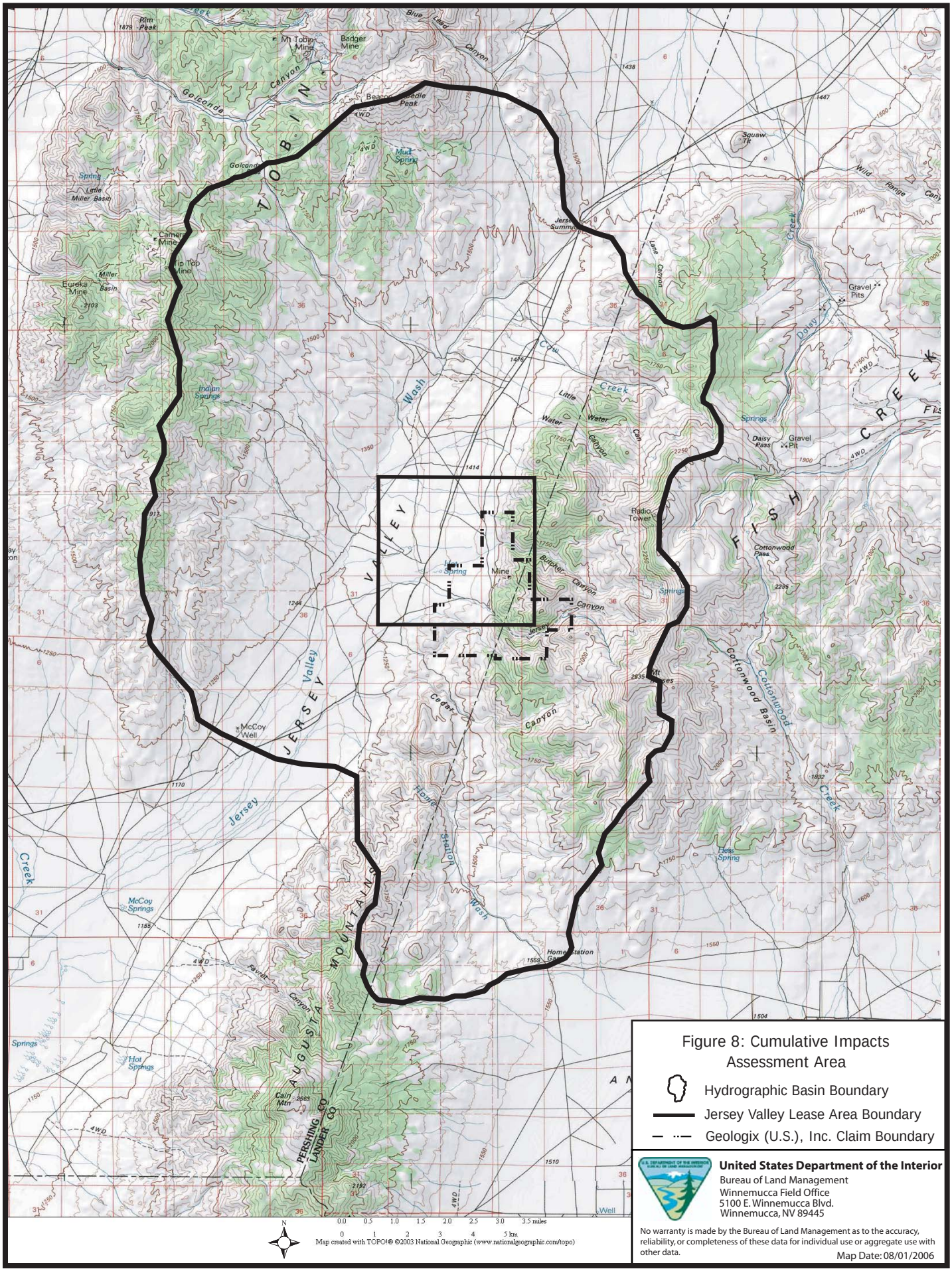
In most cases, mineral exploration would not be allowed in areas where these activities could have a negative impact on special status species. Mitigation measure(s) to survey for special status species could help reduce the potential for adverse effects if also implemented for the other actions.

5.5 No Action Alternative

No project activities would be undertaken if the No Action Alternative were selected. There would be no cumulative effects on air quality; cultural resources; invasive, nonnative species; migratory birds; Native American consultation, special status species; wastes (hazardous or solid); water quality (surface and ground); wetlands and riparian zones; geology and minerals; soils; vegetation; wildlife; range resources; recreation; visual; water quantity; and lands and realty from implementation of the No Action Alternative.

5.6 Irreversible and Irretrievable Commitment of Resources

No irreversible and irretrievable commitment of resources is expected.


TOBIN
JERSEY VALLEY
AUGUSTA MOUNTAINS
PERSHING CO
LANDER CO
Mine
Jersey Valley
Jersey Creek
Cottonwood Basin
Cottonwood Creek
Little Water Creek
Willow Creek
Indian Springs
McCoy Springs
Hot Springs
Mud Springs
Gravel Pits
Gravel Pit
Daisy Pass
Cottonwood Pass
Radio Tower
Mt Tobin Mine
Badger Mine
Camera Mine
Top Top Mine
Eureka Mine
Miller Basin
Little Miller Basin
Golconda Canyon
Blue Lead Canyon
Beacon Needle Peak
Rim Peak
Squaw Tit
Wild Range Camp
Lane Canyon
Daisy Canyon
Little Water Canyon
Bullion Canyon
Jersey Canyon
Cedar Canyon
Favret Canyon
Favret Station
Home Station
Hess Spring
Cain Mtn
Mt Tobin
Springs
Well
4WD
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 miles
0 1 2 3 4 5 km
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)
Figure 8: Cumulative Impacts Assessment Area
Hydrographic Basin Boundary
Jersey Valley Lease Area Boundary
Geologix (U.S.), Inc. Claim Boundary
United States Department of the Interior
Bureau of Land Management
Winnemucca Field Office
5100 E. Winnemucca Blvd.
Winnemucca, NV 89445
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.
Map Date: 08/01/2006

6 RECOMMENDED MITIGATION AND MONITORING

BLM requires that decisions be implemented in accordance with the appropriate decision document. Monitoring is needed to ensure that actions taken comply with the terms, conditions, and mitigation measures identified in the decision. BLM would fulfill this responsibility by monitoring the implementation of mitigation measures adopted as conditions of approval to the submitted Operations Plan, Geothermal Drilling Permits, and Right-of-Way application, as well as the stipulations attached to each of the geothermal leases.

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

- For a period of three years following the commencement of construction, project sites shall be inventoried by the lessee for the presence of invasive, nonnative species. Inventory data shall be reported to the BLM WFO project Lead within one week of receipt by the lessee. The area shall be treated with BLM certified pesticides following BLM approval of a pesticide use proposal if species are present.

- Following the three year period, periodic inventory for the presence of invasive nonnative species would be performed at project sites, with treatment occurring as necessary. The periodic inventory and treatment would occur for as long as the lessee is present at the site.

- Roads to be constructed, improved or reclaimed as part of the project would be reviewed by the BLM and required to conform to the requirements of BLM Manual 9113 and the "Gold Book" ("Oil and Gas Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development"), as applicable to the intended project use.

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

- Lessee shall monitor and collect the following hydrologic data from each of the two springs known as the Jersey Valley Hot Springs, which are located in the SW¼SW¼ of Section 28 and the SE¼SE¼ of Section 29, respectively:
    - Representative temperature, flow or stage, and basic thermal water chemistry – once immediately prior to the commencement of drilling and once immediately following the completion of drilling;
    - During the drilling or flow testing of slim or full-size well 86-29 or when extracting water from the groundwater well – Representative temperature and flow or stage – once each week until drilling, flow testing or water extracting is completed;
    - Each year following the drilling of the first well until all wells have been abandoned – Representative temperature, flow or stage, and basic thermal water chemistry – once per year.
- Collected data shall be reported to the BLM Winnemucca Field Office project Lead and Hydrologist in written form within one week of receipt by the lessee.

- Lessee shall document available information regarding fresh water aquifers which may be encountered during drilling, including the number encountered, their depths and saturated thickness, their quality, and any other properties.

- A minimum 12 inches of topsoil should be salvaged during construction and stockpiled for use during subsequent reclamation of the disturbed areas.

- Seeding of disturbed areas would be completed using the following native seed mixture and application rate. Any variance in the mix would be coordinated first with the BLM Winnemucca Field Office.

Species	PLS LBS./Acre	Bulk LBS./Acre	PLS/sq. ft.
Sandberg bluegrass	1.90	2.00	38
Fourwing saltbush	3.00	5.00	4
Shadscale	3.00	5.00	4
Indian ricegrass	1.00	1.25	4
Totals	8.90	13.25	50

PLS = Pure Live Seeds

- Wellhead equipment left on the drill site following the completion of drilling would be painted a color, subject to approval by the authorized officer, which would blend with the landscape. Prior to paint selection, Ormat would contact the Winnemucca Field Office project lead.

- All drill rig and well test facility lights would be limited to those required to safely conduct the operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.

7 COORDINATION AND CONSULTATION

7.1 List of Preparers

Bureau of Land Management, Winnemucca Field Office
Fred Holzel, Minerals and Project Lead
Lynn Harrison, Planning and Environmental Coordinator
Delores Cates, Visual Resources
Scott Clarke, Rangeland Specialist
Clarence Covert, Wildlife Specialist
Craig Drake, Hydrologist
Regina Smith, Cultural Resources Specialist
Mark Gingrich, Hazardous Materials Specialist
Gerald Gulley, Outdoor Recreation Planner
Barbara Kehrberg, Realty Specialist
Derek Messmer, Invasive, Nonnative Species Coordinator
Mike Zielinski, Soil Scientist

Environmental Management Associates

Dwight L. Carey, D.Env.	Principal — Project Manager, Introduction; Proposed Action and Alternatives; Water Quality (Surface and Ground) and Water Quantity.
Heather T. Altman	Senior Environmental Specialist — Air Quality; Cultural Resources; Invasive, Nonnative Species; Migratory Birds; Native American Consultation; Special Status Species; Wastes, Hazardous or Solid; Geology and Minerals; Soils; Vegetation; Wildlife Resources; Range Resources; Recreation; Visual Resources; Economic Values; Lands and Realty and Cumulative Impacts.

7.2 Agencies, Groups, and Individuals Contacted

United States Fish and Wildlife Service, Nevada Fish and Wildlife Office
Robert D. Williams, Field Supervisor

Nevada Natural Heritage Project
Eric S. Miskow, Biologist III/Data Manager

Nevada Department of Wildlife, Winnemucca Field Office
Clint Garrett, Habitat Biologist

Ormat Nevada, Inc.
Stuart Johnson, Project Manager
Scott Kessler, Regulatory Affairs Administrator

SRK Consulting
Gary Back, Principal Ecologist

County of Pershing
Dora Wren, County Planner

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). 1988. Bureau of Land Management National Environmental Policy Act Handbook (BLM NEPA Handbook H-1790-1). October 25, 1988.

Bureau of Land Management (BLM), Winnemucca District Office (WFO). 2002. Geothermal Resources Leasing: Programmatic Environmental Assessment. August 2002.

Bureau of Land Management (BLM). 2006. Geographic Report, Mining Claim Only. Land and Mineral Records, LR2000. Retrieved on May 17, 2006.

Cates, Delores. 2004a. Personal Communication. Geologist, Bureau of Land Management, Winnemucca Field Office. March 12, 2004

Cates, Delores. 2004b. Personal Communication. Geologist, Bureau of Land Management, Winnemucca Field Office. April 19, 2004

Cates, Delores. 2004c. Personal Communication. Geologist, Bureau of Land Management, Winnemucca Field Office. June 18, 2004

Clarke, Scott. 2006. Personal Communication. Rangeland Specialist, Bureau of Land Management, Winnemucca Field Office. May 23, 2006.

Covert, Clarence. 2006. Personal Communication. Wildlife Biologist, Bureau of Land Management, Winnemucca Field Office. May 25, 2006.

Crawford, John A., R.A. Olson, N.E. West, J.C. West, M.A. Schroeder, T.D. Whitson, R.F. Miller, M.A. Gregg, and C.S. Boyd. 2004. Synthesis Paper Ecology and Management of Sage-Grouse and Sage-Grouse Habitat. Journal of Range Management 57: 2-19. January 2004.

Crimmins, Duane. 2004. Personal Communication. Wildlife Management Biologist, Bureau of Land Management, Battle Mountain Field Office. April 21, 2004.

Ennes, Mark. 2004. Cultural Resource Survey for the ORMAT Nevada, Inc. Geothermal Exploration Temperature Gradient Holes. BLM Report Number 2888 (P). Report on file, Winnemucca Field Office.

Ennes, Mark. 2006. Cultural Resource Survey for the Jersey Valley Geothermal Exploration Project Plan of Operations. BLM Report Number 2950 (N). Report on file, Winnemucca Field Office.

Gingrich, Mark. 2006. Personal Communication. Hazardous Materials Specialist, Bureau of Land Management, Winnemucca Field Office. May 31, 2006.

Kautz Environmental Consultants, Inc. (KEC). 2007. Cultural Resources Inventory of Five Geothermal Exploration Drill Pads in Jersey Valley, Pershing County, Nevada. BLM Report No. CR 2-1577(P). Revised January 30, 2007.

Loptien, Greg. 2006. Geologix (U.S.). Email Communication to Fred Holzel, Bureau of Land Management, Winnemucca Field Office. June 16, 2006.

Messmer, Derek. 2006 Personal Communication. Weed Specialist, Bureau of Land Management Winnemucca Field Office. May 25, 2006.

Nevada Bureau of Mines and Geology (NBMG). 1985. Jersey Valley District. Internet Address: http://www.nbmg.unr.edu/scans/2540/25400007.pdf. Retrieved on January 25, 2005.

Nevada Bureau of Mines and Geology (NBMG). 2004. Geothermal Resources of Nevada. Internet Address: http://www.nbmg.unr.edu/geothermal/site.php?sid=Jersey%20Valley.

Nevada Department of Conservation and Natural Resources (NDCNR), Division of Water Resources (DWR). 2004. Central Region 10. Internet Address: http://water.nv.gov/Water%20planning/overview/hy_basin.htm#TITLE10. Accessed June 14, 2004.

Nevada Department of Conservation and Natural Resources (NDCNR), Division of Water Resources (DWR). 1974. Static Ground Water Levels of Nevada, Prepared as Part of the Nevada State Water Plan.

Nevada Natural Heritage Program. 2001. Nevada Rare Plant Atlas. Carson City, Nevada. June 2001.

Nevada Natural Heritage Program (NNHP). 2006. Sensitive Taxa recorded near the Jersey Valley Geothermal Exploration Project Area. Nevada Department of Conservation and Natural Resources. Carson City, Nevada. April 18, 2006.

Stamm, Mike. 2004. Personal Communication. Wildlife Management Biologist, Bureau of Land Management, Battle Mountain Field Office. June 4, 2004.

U.S. Census Bureau. 2005a. Humboldt County Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=04000US32&_geoContext=01000US%7C04000US32&_street=&_county=humboldt+county&_cityTown=humboldt+county&_state=04000US32&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=040. December 8, 2005.

U.S. Census Bureau. 2005b. Winnemucca City Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=05000US32013&_geoContext=01000US%7C04000US32%7C05000US32013&_street=&_county=winnemucca&_cityTown=winnemucca&_state=04000US32&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=050. December 8, 2005.

U.S. Census Bureau. 2006a. Pershing County Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=16000US3243000&_geoContext=01000US%7C04000US32%7C16000US3243000&_street=&_county=pershing+county&_cityTown=pershing+county&_state=04000US32&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=160&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed May 17, 2006.

U.S. Census Bureau. 2006b. Lovelock City Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=05000US32027&_geoContext=01000US%7C04000US32%7C05000US32027&_street=&_county=lovelock&_cityTown=lovelock&_state=04000US32&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=050&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=. Accessed May 17, 2006.

U.S. Census Bureau. 2006c. Lander County Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=lander+county&_cityTown=lander+county&_state=&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010. Accessed June 23, 2006.

U.S. Census Bureau. 2006d. Battle Mountain CDP Quickfacts from the U.S. Census Bureau. Internet Address: http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=05000US32015&_geoContext=01000US%7C04000US32%7C05000US32015&_street=&_county=battle+mountain&_cityTown=battle+mountain&_state=04000US32&_zip=&_lang=en&_sse=on&ActiveGeoDiv=geoSelect&_useEV=&pctxt=fph&pgsl=050&_submenuId=factsheet_1&ds_name=DEC_2000_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry= Accessed June 23, 2006.

U.S. Environmental Protection Agency. 2006. Currently Designated Nonattainment Areas for All Criteria Pollutants. Internet address: http://www.epa.gov/oar/oaqps/greenbk/ancl.html#NEVADA. Accessed May 11, 2006.

U.S. Fish and Wildlife Service. 2006 Letter from Robert D. Williams, Field Supervisor, Nevada Fish and Wildlife Office, to Heather T. Altman, Environmental Management Associates, Inc. June 12, 2006.

Wren, Dora. 2004. Personal Communication. County Planner, County of Pershing Planning and Zoning Department. June 10, 2004.

Zielinski, Mike. 2004. Personal Communication. Soil Scientist, Bureau of Land Management, Winnemucca Field Office. May 26, 2004.

Zielinski, Mike. 2006. Personal Communication. Soil Scientist, Bureau of Land Management, Winnemucca Field Office. May 24, 2006.

Appendix A: Special Geothermal Lease Stipulations, Lease NVN-77483

NVN-77483

BLM WINNEMUCCA FIELD OFFICE GEOTHERMAL LEASE STIPULATION FOR SPECIAL STATUS SPECIES

Penstemon palmerii var. macranthus, and Lahontan beardstongue, both special status plant species (T&E/Sensitive) have been identified in the vicinity lands contained in this lease. The lease lands contain similar habitat and associated plant species. Prior to approval of ground disturbing activities, the lessee shall contact the BLM to coordinate the need for a field inventory to determine the presence of this species. If these plant species are identified in the area of proposed surface disturbing activities, then the Winnemucca Field Office Geothermal Lease Stipulations for Threatened, Endangered or Sensitive Species will apply.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 01 2005
NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

BLM WINNEMUCCA FIELD OFFICE GEOTHERMAL LEASE STIPULATION FOR BATS

Two species of bats, the Pallid bat (*Antrozous pallidus*) and Townsend's big-eared bat (*Corynorhinus townsendii*) use adits located within secs. 27 and 34, T. 27 N., R. 40 E., MDM, Nevada. The lease will be subject to the following protection measures:

a) The No Surface Occupancy restriction will apply to a 0.25-mile radius around the openings of adits occupied by these bats.
b) Caution should be used to avoid coming in contact with any of the adits during drilling.
c) Personnel should be cautioned to avoid entering the 0.25-mile radius around the openings of adits occupied by these bats.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2006
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2006
NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

BLM WINNEMUCCA FIELD OFFICE
GEOTHERMAL LEASE STIPULATIONS

Noncompetitive areas and all Known Geothermal Resource Areas (KGRA) will be open to geothermal leasing with the following restrictions:

Sage grouse: The following stipulations apply to protect sage grouse and their habitat. Known habitat is defined as those areas where sage grouse have been observed. Potential habitat is an areas where sage grouse may occur. **Known Breeding habitat and Leks:** February through June, but may vary on site specific basis. Avoid all activity within 3.3 km. (2 miles) of known leks during the mating season - March through May, or as determined by Field Office and Wildlife Personnel. No surface occupancy within 3.3 km (2 miles) of known leks at all times. **Nesting Habitat and Brood-rearing habitats:** (April through August per Interim NV Guidelines) and Winter Habitats: (October through March). **Known Habitat:** Avoid all development or exploration activities within 3.3 km (2 miles) or other appropriate distance based on site-specific conditions, of leks, or within 1 km. (0.6 mi.) of known nesting, brood-rearing and winter habitat. **Potential Habitat:** Avoid permanent occupancy of potential habitat.

General Sage Grouse Stipulations: Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Controlled Or Limited Surface Use: (avoidance and/or required mitigation measures to be developed) – Are applicable for all leases proposed in areas of crucial deer, antelope, and big horn sheep habitat during migration and critical fawning and kidding areas.

Other Biota: Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Threatened, Endangered or Sensitive Species:
No surface occupancy: No surface occupancy within 1 mile of occupied or identified potential Lahontan Cutthroat Trout (LCT) habitat.
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed) The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros:
Controlled or Limited Surface Use: (avoidance and/or mitigation measures to be developed.) If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds: Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed). All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.
Riparian Areas: No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.
Noxious Weeds: During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources
No surface occupancy: No surface occupancy within the setting of National Register eligible sites where integrity of setting is critical to their eligibility.
Controlled Or Limited Surface Use: (avoidance and/or mitigation measures to be developed). All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American
No surface occupancy: No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance

or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources
Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources
As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented. The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The lessee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation. These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way

Hazardous Materials
Prior to exploration and development, an emergency response plan will be developed to include contingencies for hazardous material spills and disposal.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

NVN-77483

Stipulations to be applied to the portion of Geothermal Lease Application NVN-77483 located in the Shoshone-Eureka Planning Area of the Battle Mountain Field Office.

	The operator would be required to implement at the direction of the Assistant Field Manager testing of emissions for H2S and other noxious / deadly gases where there is indication that these gases may occur.
	Cultural resources would be avoided and mitigation measures would be developed on a case-by-case basis as required by regulations, lease terms and attached stipulations developed during site specific NEPA analysis.
	As surface disturbing activities occur, the BLM would require that the operator monitor the water temperature and outflow of water from local hot springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation.
	The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The special status species list is reviewed and / or updated annually and as species are added, new mitigations / stipulations may add further restrictions. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation. Exploratory endeavors on the public lands would require a Special Status Species review, and may require a field survey for the presence of Special Status Species. Potential impacts to Special Status Species would be analyzed on a case-by-case basis. Mitigation measures would be developed on an individual project basis depending upon the results of the survey. Springs within ½ mile of exploration activities would be inventoried

	by BLM approved and supervised personnel for the presence of invertebrates. If a rare genus, such as Pyrgulopsis, is found, identification to species and monitoring of effects of the proposed action would be required and site-specific mitigation may be developed by the BLM. BLM could require measures listed below for activities in sage grouse and ferruginous hawk habitat. Sage grouse: Operations would avoid active leks (strutting grounds) by 2 miles during strutting season (see Management Guidelines for Sage Grouse and Sagebrush Ecosystems in Nevada, October 2000). Approximate dates: March 1 - May 15 Operations would avoid nesting and brood rearing habitat (especially riparian habitat where broods concentrate beginning usually in June) by ½ mile during the time such areas are in use. Approximate dates: April 1 - August 15 Operations would avoid sage grouse wintering habitat by ½ mile while occupied. Most known wintering grounds in the Shoshone-Eureka Resource Area occur at high elevations and are not likely to be affected. Avoidance dates would vary with severity of the winter. BLM would limit the disturbance to and fragmentation of all known sage grouse habitat. Ferruginous hawks: Operations would avoid active nests by ½ mile. Approximate dates: March 15 - July 1

	All applicants for exploration permits would be required to submit a surface water inventory to the Assistant Field Manager before authorization would be granted. The inventory would include a map of appropriate scale (such as 1:24,000) indicating the location of all surface water on public land within ½ mile radius from the surface-disturbing activity. At the commencement of surface disturbing activities for the drilling of exploration wells, the BLM would require that the drilling company monitor the water temperature and / or outflow of water from local springs and existing wells as directed by the Assistant Field Manager. If the temperature and outflow of the water from the spring or well were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective actions. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation. Results would be reported to Federal and State agencies on the status of these hydrologic systems during drilling. Impacts include, but are not limited to, the following: Change in water temperature Change in discharge rate Substantial decrease in water table level Surface subsidence In the event of impacts to surface or subsurface waters, determined by the Assistant Field Manager to be more than negligible, or if a violation of Federal or State water quality standards occurs, the Assistant Field Manager would assess the situation, and may require the operator to amend, relocate or discontinue operations. If operations were terminated, the BLM would develop and the operator would implement remediation measures. Typical measures include: No use of the surface water; Limitations on the type of equipment that may be used; and Restrictions of activities during certain times of the year.
	Surface waters, wetlands and riparian areas would be avoided as much as possible. No exploration activities should occur within 100 feet of riparian areas. The NOTICE OF INTENT TO CONDUCT GEOTHERMAL RESOURCE EXPLORATION OPERATIONS (Form 3200-9), terms and conditions, number 10 states that "Vegetation shall not be disturbed within 300 feet of waters designated by the Authorized Officer, except at approved stream crossing." Where surface waters, wetlands and riparian areas cannot be avoided (100 feet for non-surface disturbing exploration activities and 300 feet for surface disturbing exploration activities), mitigation would be developed on a case-by-case basis.

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 0 1 2005
NEVADA STATE OFFICE
RENO, NEVADA

	Typical measures include: No use of the surface water; Limitations on the type of equipment that may be used; and Restrictions of activities during certain times of the year. The BLM would require that the drilling company monitor the temperature and outflow of water from local hot springs. If the temperature and / or outflow of water from a spring were impacted to a degree determined by the Assistant Field Manager to be more than negligible, the BLM would require the operator to take corrective action. Failure of the operator to take the corrective measures as directed could result in BLM's terminating the operation.
	Areas to be involved in surface disturbing activities would be inventoried for the presence of invasive, nonnative species and treated if present. The exterior of all vehicles and heavy equipment would be cleaned by water before entering public lands to do work. To minimize the possibility for contamination, a designated wash area would be designated by the BLM and would be established and monitored by the operator in high use areas. The boots of operators and other persons working in the areas would be cleaned of seed before coming onto BLM lands. The BLM would develop and the operator would implement a weed treatment program from the time operation commences until the site is abandoned. Seed and mulch used to reclaim disturbed areas would be free of invasive nonnative species. Operator and workers would driving through or parking in areas where invasive nonnative species occur. When sites are abandoned, they would be inventoried for the presence of invasive nonnative species and treated if present.
	Avoid existing rights-of-way where possible. Proposed leases would not be allowed to overlap existing land use authorizations if they would adversely affect the valid existing authorization.
	If operations cause a water source to become unavailable to livestock, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for livestock. If the lease area is within a grazing allotment, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.
	None identified.
	None identified.

	Disturbed areas would be reseeded with native or introduced plant species, depending on the site conditions. Disturbed areas would be reseeded with pure live seed (certified weed free) with the mixes in Appendix F. Native vegetation would be used wherever possible. However, to compete with invasive nonnative species, introduced species, as suggested in the seed list in Appendix F, would be used.
	None identified.
	The BLM would limit the amount of ground clearing or other disturbance (such as the creation of cross-country access to drill sites) that an operator may do during the migratory bird nesting season. Areas to be disturbed would be surveyed, by personnel approved and supervised by the BLM to determine the existence and location of any nests. If any nests were located, the nest would be avoided by ¼ mile. If the nest area cannot be avoided, mitigation would be developed on a case-by-case basis.
	If operations cause a water source to become unavailable to wildlife, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for wildlife. If the lease area is within a wildlife management area, the Assistant Field Manager may require additional measures, including seasonal restrictions or no surface occupancy.
	If operations cause a water source to become unavailable to wild horses, the Authorized Officer may require a new well to be drilled, or another water development to be constructed in the general area to provide adequate water for the wild horses. If the lease area is within a HMA, the Assistant Field Manager may require additional measures for the protection of wild horses and burros, such as seasonal restrictions.
	Operators would adhere to all Standard Operating Procedures as outlined in this EA, unless specifically waived by the Assistant Field Manager.
	Because playas are important recreational places, apt to have cultural sites nearby and provide critical habitat for some migratory waterbirds and shorebirds, including Special Status Species such as the Snowy Plover, mitigation measures would be developed on a case-by-case basis. Mitigation may include no surface occupancy and seasonal restrictions.

Signature of Lessee
DANIEL SCHOCHET
VICE PRESIDENT

June 30, 2005
Date

RECEIVED
Bur. of Land Management
9:00 A.M. JUL 01 2005
NEVADA STATE OFFICE
RENO, NEVADA

Appendix B: Special Geothermal Lease Stipulations, Lease NVN-74881

Serial Number N-74881

General Stipulations for Leasing Geothermal Resources Managed by the Winnemucca Field Office (Winn Stip)

General Sage Grouse Stipulation
Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Other Biota
Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed)
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros
If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds
Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.

Riparian Areas

No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.

Noxious Weeds

During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed).
All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American

No Surface Occupancy

No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources

Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources

As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented.

The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The leasee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation.

These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way.

Hazardous Materials
Prior to exploration and development, an emergency response plan will developed that include contingencies for hazardous material spills and disposal.

Signature of Lessee, Agent, or Attorney in Fact

18 Sept 2007
Date

Appendix C: Special Geothermal Lease Stipulations, Lease NVN 74883

Serial Number N-74883

General Stipulations for Leasing Geothermal Resources Managed by the Winnemucca Field Office (Winn Stip)

General Sage Grouse Stipulation
Prior to entry on any lease areas which include known or potential habitat, the lessee (operator) shall contact the appropriate BLM Field Office to discuss any proposed activities.

Other Biota
Prior to site development, a survey for invertebrates will be conducted on areas where geothermal surface expressions occur.

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed)
The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 U.S.C. 1531, as amended, including completion of any required procedure for conference or consultation.

Wild Horse and Burros
If wild horse or burro populations are located on sites proposed for development, it may be necessary to avoid or develop mitigation measures to reduce adverse impacts to horses. These measures may include providing alternative water sources for horses of equal quality and quantity.

Migratory Birds
Surface disturbing activities during the migratory bird nesting season (March to July) may be restricted in order to avoid potential violation of the Migratory Bird Act. Appropriate inventories of migratory birds shall be conducted during analysis of actual site development. If active nests are located, the proponent shall coordinate with BLM to establish appropriate protection measures for the nesting sites which may include avoidance or restricting or excluding development during certain areas to times when nests and nesting birds will not be disturbed. During development and production phases, if artificial ponds potentially detrimental to migratory birds are created, these shall be fitted with exclusion devices such as netting or floating balls.

Vegetation
All areas of exploration and or development disturbance will be reclaimed including re-contouring disturbed areas to blend with the surrounding topography and using appropriate methods to seed with a diverse perennial seed mix. The seed mix used to reclaim disturbed areas would be "certified" weed free.

Riparian Areas

No surface occupancy within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas or 100-year floodplains to protect the integrity of these resources (as indicated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.

Noxious Weeds

During all phases of exploration and development, the lessee shall maintain a noxious weed control program consisting of monitoring and eradication for species listed on the Nevada Designated Noxious Weed List (NRS 555.010).

Cultural Resources

Controlled Or Limited Surface Use (Avoidance and/or Mitigation Measures To Be Developed).
All surface disturbing activities proposed after issuance of the lease are subject to compliance with Section 106 of the National Historic Protection Act (NHPA) and it's implementation through the protocol between the BLM Nevada State Director and the Nevada State Historic Preservation Officer.

Native American

No Surface Occupancy

No surface occupancy within the setting of National Register eligible Traditional Cultural Properties (TCPs) where integrity of the setting is critical to their eligibility. For development and production phases, surface occupancy may be limited to a specific distance or precluded at hot springs, pending conclusion of the Native American consultation process. All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

Paleontological Resources

Where significant paleontological resources are identified, mitigating measures such as data recovery, restrictions on development, and deletion of some areas from development may be required on a case by case basis.

Water Resources

As exploration and development activities commence, the operator shall institute a hydrologic monitoring program. The details of the monitoring programs will be site specific and the intensity shall be commensurate with the level of exploration. For example, if the proponent will be conducting seismic studies the monitoring would be limited to the identification of water resources to be monitored as activities continue; if a drilling program were to be undertaken the number of aquifers encountered, their properties, their quality, and their saturated thickness would be documented.

The information collected will be submitted to the Bureau of Land Management and will be used to support future NEPA documentation as development progresses. Adverse impacts to surface expressions of the geothermal reservoir (hot springs), and Threatened and Endangered Species habitat are not acceptable. The leasee will monitor the quality, quantity, and temperature of any hot springs or other water resource within the project area whenever they are conducting activities which have the potential to impact those resources. If adverse impacts do occur, BLM will require the lessee to take corrective action to mitigate the impact. Corrective action may include shutting down the operation.

These are in addition to the other stipulations. These are LEASE stipulations, not operational, the information gathered under the monitoring stipulation will be used to identify future impacts at the operational stage.

Lands & Realty
No drilling, including exploration or development activities within linear Rights-of-Way.

Hazardous Materials
Prior to exploration and development, an emergency response plan will developed that include contingencies for hazardous material spills and disposal.

Signature of Lessee, Agent, or Attorney in Fact

10 Sept 2002

Date

Appendix D: U.S. Fish and Wildlife Service Consultation

JUN 15 2006

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Nevada Fish and Wildlife Office
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
Ph: (775) 861-6300 ~ Fax: (775) 861-6301

June 12, 2006
File No. 1-5-06-SP-164

Ms. Heather T. Altman
Environmental Management Associates
588 Explorer Street
Brea, California 92821

Dear Ms. Altman:

Subject: Species List for Slim Well Geothermal Site, Pershing County, Nevada

This responds to your letter received on May 30, 2006, requesting a species list for the Slim Well Geothermal Site, eastern Pershing County, Nevada. To the best of our knowledge, no listed, proposed, or candidate species occur in the subject project area. This response fulfills the requirement of the Fish and Wildlife Service to provide a list of species pursuant to section 7(c) of the Endangered Species Act of 1973 (Act), as amended, for projects that are authorized, funded, or carried out by a Federal agency.

The Nevada Fish and Wildlife Office no longer provides species of concern lists. Most of these species for which we have concern, are also on the sensitive species list for Nevada maintained by the State of Nevada's Natural Heritage Program (Heritage). Instead of maintaining our own list, we are adopting Heritage's sensitive species list and partnering with them to provide distribution data and information on the conservation needs for sensitive species to agencies or project proponents. The mission of Heritage is to continually evaluate the conservation priorities of native plants, animals, and their habitats, particularly those most vulnerable to extinction or in serious decline. Consideration of these sensitive species and exploring management alternatives early in the planning process can provide long-term conservation benefits and avoid future conflicts.

For a list of sensitive species by county, visit Heritage's website at www.heritage.nv.gov. For a specific list of sensitive species that may occur in the project area, you can obtain a data request form from the website or by contacting Heritage at 901 South Stewart Street, Suite 5002, Carson City, Nevada 89701-5245, 775-684-2900. Please indicate on the form that your request

is being obtained as part of your coordination with the Service under the Act. During your project analysis, if you obtain new information or data for any Nevada sensitive species, we request that you provide the information to Heritage at the above address. Furthermore, certain species of fish and wildlife are classified as protected by the State of Nevada (see http://www.leg.state.nv.us/NAC/NAC-503.html). Before a person can hunt, take, or possess any parts of wildlife species classified as protected, they must first obtain the appropriate license, permit, or written authorization from the Nevada Department of Wildlife (visit http://www.ndow.org or call 775-688-1500).

Please reference File No. 1-5-06-SP-164 in future correspondence concerning this species list. If you have any questions regarding this correspondence or require additional information, please contact me or Stanley Wiemeyer at (775) 861-6300.

Sincerely,

for Robert D. Williams
Field Supervisor

Appendix E: Best Management Practices for Road Construction

Best Management Practices for Road Construction

General Guidelines

Evaluate the erosion potential for the project to determine the level and extent of highly erodible areas requiring coordination between engineering, soils and hydrology. Recognize the cost of road construction will be significantly greater in erodible terrains.

Soils that have a low bearing strength tend to rut readily when wet, which leads to water concentration and erosion. This low bearing strength results in water quality impacts. Roads constructed in these soils should be designed to withstand wet weather traffic or traffic should be restricted in wet seasons.

If there is a potential for wet weather use, a stable road bases should be designed. For long term all weather use, the road should have a structural section designed to mitigate rutting.

Road Slope and Spoil Disposal Area Stabilization

Identify soil environmental site factors and their variance along the roadway. Determine the proper seed/fertilizer mixture to stabilize roadway slopes and waste spoil areas.

Mechanical stabilization should be accomplished in highly erodible soils using geotechnical materials, jute netting, punched straw or other proven technique.

In areas of highly erodible soil, windrow clearing debris at the base of the fill slopes to mitigate erosion.

Road Slope Stabilization

For cut slopes, allow them to be left as steep as possible to minimize the surface area subject to erosion. Do not lay the slopes back.

Control of Road Drainage

For roads within highly erodible areas, use insloped roads only in cases where maintenance can be performed on a regular basis. All other roads should be outsloped.

For highly erodible soils, inslope and ditch fill sections with culverts in order to prevent water from flowing down the face of fills.

Berms may be used to direct water to overside drains, if available.

Culvert headwalls should be constructed for perennial or intermittent stream crossings in highly erodible soil areas using riprap, soil cement, concrete, in order to prevent erosion.

Energy dissipators should be used in areas of water concentration, where significant erosion will result.

Construction of Stable Embankments (Fills) and Culvert Backfill

In highly erodible soil areas, the larger and more critical fills should be compacted to 95% of AASHTO T-99 specification. Fillslopes should be constructed at 1½ to 1. For fills compacted through layer placement along, fillslopes should be constructed at 1¾ to 1. No fills will be constructed on side slopes exceeding 55%.

For areas designed to have compacted fills and having slopes exceeding 40%, terrace the natural slope to key in the fill.

Care should be taken to compact the outer edge of the fill in highly erodible soil areas using a sheeps-foot type roller or other approved techniques.

Maintenance of Roads

In highly erodible soil areas, special attention should be paid to maintaining road drainages, including surface drainage configuration, culverts and overside drains for roads having all levels of maintenance. Cut slopes should not be undercut and drainages should be kept open, clean and functioning.

Road Surface Treatment to Prevent Loss of Materials

For road construction in areas having highly erodible soils, full-width stabilization, including the ditch, should be performed using aggregate, asphalt concrete, penetration oil treatment or other approved methods that will achieve long term stabilization of the road bed. Stabilization methods should be designed to exceed normal use so erosion control devices remain effective well past the intended use. Stabilization should be considered for road segments adjacent to or crossing sensitive streams, grades exceeding 6% and for areas having sideslopes in excess of 30%.