ENVIRONMENTAL ASSESSMENT

NEWBERRY GEOTHERMAL EXPLORATION PROJECT

August 2007

Western Flank Newberry Volcano
Federal Geothermal Leases OR-12437
and OR-40497
Deschutes County, Oregon

EA Number: OR-050-07-075

Lead Agency:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Prineville District Office
3050 N.E. Third Street
Prineville, OR 97754

Cooperating Surface Management Agency:

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Deschutes National Forest
Bend-Fort Rock District
1230 NE Third Street
Bend, OR 97701

Project Applicant:

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CHAPTER I. INTRODUCTION: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) is prepared by the Prineville District of the USDI Bureau of Land Management (BLM), for the proposed Newberry Geothermal Exploration Project. This EA documents the site-specific environmental analysis of potential effects that could result from the implementation of the Proposed Action or No Action alternatives.

In this Environmental Assessment, the BLM is analyzing potential impacts of implementing a proposed Plan of Exploration (POE), including amendments, to explore geothermal resources within the Bend-Fort Rock Ranger District of the Deschutes National Forest. Davenport Power, LLC (Applicant and Operator for the lease holder, Northwest Geothermal Company), submitted a POE (on file at the BLM office in Prineville) on February 9, 2007 as an application to construct three well pads and drill up to three 10,000-foot geothermal exploration wells at each well pad. The purpose and need of the project will be to assess the geothermal resource potential of the area for the generation of electricity. Based on the findings, the applicant will decide if the geothermal resource is sufficient or if there are additional exploration needs. Either of these future scenarios is dependent on drilling results and cannot be determined at this time. Future projects are beyond the scope of this EA but would be subject to a new NEPA review if variations of either scenario were proposed in the future.

The POE includes upgrades to existing access roads, well pads, drilling, and well testing procedures that are either identical or very similar to those analyzed in the June 1994 Environmental Impact Statement for the Newberry Geothermal Pilot Project (1994 Geothermal EIS). Although the actions in the POE are similar to those that have occurred on adjacent geothermal leases, some resource conditions and legal requirements for the area have changed since 1994. Since the 1994 Geothermal EIS did not anticipate the potential for further exploration of area, it did not specifically include the features described in the POE. This EA will incorporate by reference the analysis contained in the 1994 Geothermal EIS where it is appropriate and applicable to the actions proposed in the POE. Actions that are different, or where resource conditions or effects have changed require site specific analysis and are analyzed in this EA.

BLM is the lead agency responsible for management and administration of federal geothermal leases and subsurface activities. The USDA Forest Service is the agency responsible for managing activities that occur on National Forest lands; therefore, the Deschutes National Forest has a role as a cooperating agency in the environmental analysis.

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 and the Council of Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508) implementing NEPA, the Federal Land Policy and Management Act (FLPMA) of 1976, and with the 1990 Deschutes National Forest Land and Resource Management Plan (LRMP) as amended.

This EA supports the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA). This EA also assists the BLM in making a determination on whether any significant impacts could result from the analyzed actions. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or to issue a "Finding of No Significant Impact" (FONSI). A FONSI briefly presents the reasons why implementation of the proposed actions will not result in significant environmental impacts, and is part of the decision. "Significance" is defined by NEPA and is found in regulation 40 CFR 1508.27. A Decision Record will be signed to document the decision, after the analysis and public comment on the EA have been considered.

This EA will provide the decision-maker, the Prineville District BLM Manager, with information to decide whether to approve or decline applicants POE proposal and if approved, under what terms and conditions. This EA will also determine if there are impacts beyond those already analyzed in the 1994 Geothermal EIS, whether new data to supplement information from that Environmental Impact Statement is needed, and whether a Finding of No Significant Impact is appropriate.

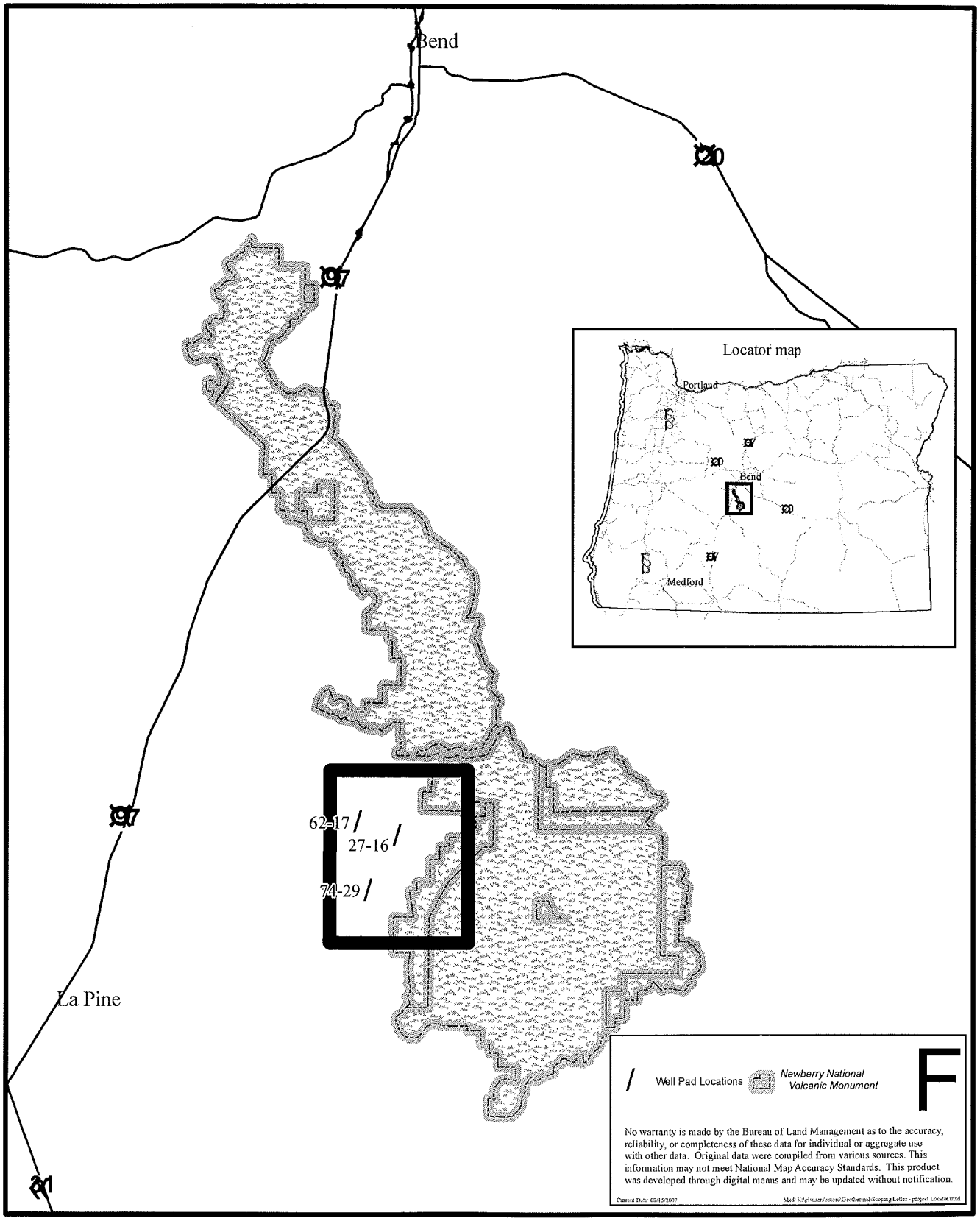
1.2 SUMARY OF THE PROPOSED ACTION

Northwest Geothermal Company (NGC) holds two federal geothermal leases issued by the BLM in 1983 (OR-12437 and OR-40497) on the western flank of Newberry Volcano, in Sections 16, 17, and 29 in Township 21 South, Range 12 East, W.M., on the Bend Fort Rock Ranger District of the Deschutes National Forest, Deschutes County, Oregon (Figure 1.1). On February 9, 2007, the applicant submitted a Plan of Exploration[1] to construct three well pads, a short segment of temporary road, to drill and test up to nine wells, and to use existing access roads on these federal geothermal leases. Results from the exploration wells will be used to evaluate and define the extent and characteristics of the geothermal reservoir beneath their leases. If approved, implementation of the POE would begin in the fall of 2007 and continue for approximately one to three years under terms and conditions to be described in the BLM District Manager's NEPA decision.

1 Available upon request from the Prineville BLM office.

Newberry Geothermal Exploration Project

Project Location **Figure 1.1**



1.3 BACKGROUND

Newberry Volcano is recognized by geologic and scientific communities for its geothermal potential and may contain one of the best prospects for geothermal exploration in the continental United States. This potential for geothermal exploration was recognized and addressed in the 1990 Congressional legislation creating the nearby Newberry National Volcanic Monument (NNVM or Monument). The current national interest to find alternative renewable energy sources supports greater exploration and study of geothermal resources.

"Geothermal energy" is heat energy from deep in the earth, often circulated by water through natural processes along zones of fractured rock deep underground. It is believed that underground steam and hot water on the west flank of Newberry Volcano are part of a deep hydrothermal system which can be accessed by drilling wells. At high temperatures, hot water or steam can be harnessed to generate electricity once it is brought to the earth's surface.

There is a high potential for a geothermal resource to exist in this area. In 1994, the Deschutes National Forest, the Prineville District BLM, and the Bonneville Power Administration (BPA) analyzed potential effects of geothermal exploration, development, and production of electrical power in the 1994 Geothermal EIS. The EIS was prepared in response to proposed Plans of Operation submitted by Cal Energy Exploration Company (Cal Energy) of Portland, Oregon for exploration, development, and production of geothermal resources on federal leases near those held by NGC. The intent of the 1994 Geothermal EIS was to determine whether the proposed geothermal energy project could provide a reliable, economically viable, environmentally acceptable, and technically feasible alternative source of electricity for the public.

The 1994 Geothermal EIS analyzed in detail, the potential effects associated with well pads, well drilling, access roads, steam pipelines, power plants, transmission lines, and related facilities and actions on nearby leases owned by Cal Energy. The 1994 Geothermal EIS addressed a project much larger than that currently proposed by the applicant, as it involved full scale exploration, a large production drilling program, power plants for energy production, and electrical transmission lines.

The Prineville District BLM, Deschutes National Forest, and BPA approved the geothermal activity as outlined in two Records of Decision. Cal Energy implemented their project in 1994 and drilled several exploration wells; however, the results were not conclusive and Cal Energy put their project into suspension in 1996. Three well pads are still located on their leases, but wells have been plugged. Cal Energy sold their leases along with the project, to ORMAT who continues to maintain the project area in accordance with BLM and Forest Service direction and oversight.

The 1994 Geothermal EIS analyzed effects and impacts associated with exploration and development on leases adjacent to NGC's proposed project (Figure 1.2). The applicant's proposal to drill up to nine 10,000-foot exploration wells on three pads has been determined by BLM to be similar to those analyzed in the 1994 Geothermal EIS (Section 2.4,

Alternatives Considered in Detail, 1994 Geothermal EIS). The 1994 Geothermal EIS covered drilling procedures and effects associated with drilling and subsequent testing of geothermal wells, as well as the impacts associated with access roads and pad construction, development of power plants and establishment of transmission lines. This EA incorporates by reference the applicable analysis contained in the 1994 Geothermal EIS where appropriate (actions and effects are the same) because it analyzed and disclosed in detail, impacts associated with all phases of siting, drilling, and testing of geothermal exploration wells on the Cal Energy leases. However, since some features of the applicants POE were not specifically included or anticipated in the 1994 project, further site specific analysis was required and has been included in this EA.

1.4 PURPOSE AND NEED

The purpose of the Proposed Action is to conduct exploration activities to acquire more information about the geothermal resource at Newberry Volcano, specifically in the area of the two federal geothermal leases identified in Davenport's Plan of Exploration.

As the federal regulatory agency responsible for administration of our nation's geothermal resources, BLM has a need to consider objectives from the National Energy Policy (May 2001), which includes the need "to expedite projects that will increase the production, transmission, or conservation of energy" (Section 1, Policy and Executive Order 13212). BLM will also consider objectives from the Energy Policy Act of 2005 (Public Law 109-58) of promoting the leasing and development of geothermal resources where appropriate on public lands.

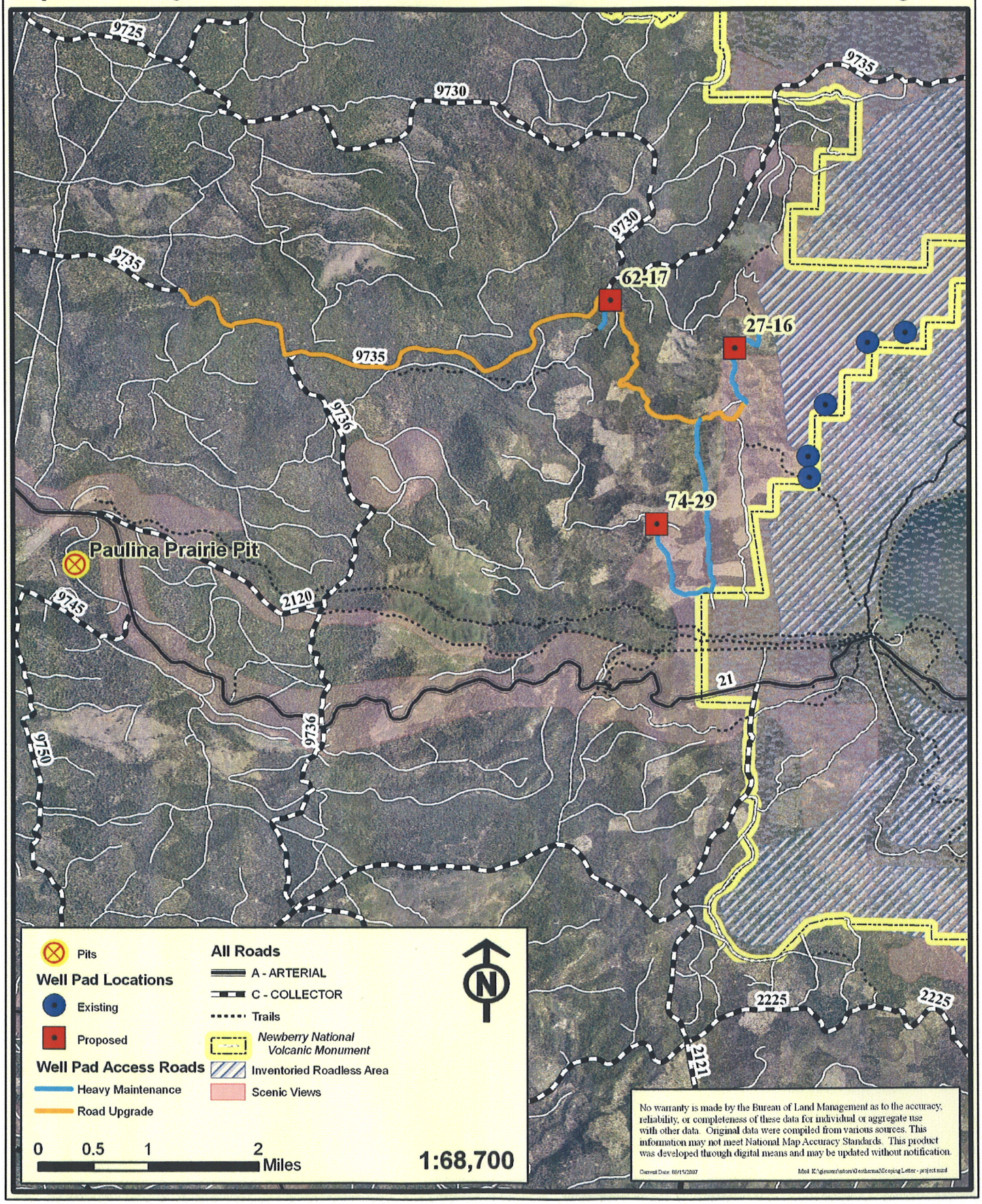
Under the terms of the Geothermal Steam Act and its implementing regulations, BLM is required to respond to proposed plans, applications, and programs submitted by a lessee or the lessee's designated operator.

The Federal Land Management Policy Act and the National Forest Management Act require that actions approved by the BLM and the Forest Service are consistent with Land and Resource Management Plans completed in accordance with those acts. These include the Deschutes National Forest Land and Resource Management Plan (1990) as amended, the BLM Upper Deschutes Resource Management Plan (2005), and the Newberry National Volcanic Monument Plan (1994).

Although this would be a federal action taking place on federal land, Oregon Governor Ted Kulongoski and the State legislature have demonstrated a need for enhanced renewable energy in the State of Oregon. In June, 2007, Governor Kulongoski signed Senate Bill 838C into law, which requires that the largest Oregon utilities provide 25 percent of their retail sale of electricity from clean, renewable sources of energy by 2025. Geothermal energy is one of the renewable energy sources identified in Oregon's program.

Newberry Geothermal Exploration Project

Proposed & Existing Well Pad Locations **Figure 1.2**



1.5 SCOPING AND PUBLIC INVOLVEMENT

Scoping letters were sent to 157 individuals, organizations, agencies, and central Oregon Tribes in June, 2007 to notify potentially interested parties about the proposed action and to provide an opportunity to submit comments for BLM to consider in the environmental analysis. Three written responses were received and were considered during the EA process. The comment letters were reviewed and analyzed, and all substantive comments were considered and addressed during preparation of the EA. Information has been included in the EA to respond to or provide information related to comments received. The applicant has conducted informal outreach and provided information about the proposed project and about geothermal energy in general, through personal contacts, emails, and in public meetings and workshops. More detail about these efforts can be found in Chapter VI. The BLM and Deschutes National Forest have initiated consultation with the Confederated Tribes of the Warm Springs Reservation and the Klamath and Burns Paiute Tribes, and will continue consultation throughout the implementation of the POE.

1.6 RELATIONSHIP TO LAND USE PLANS, POLICIES, AND STATUTES

Deschutes National Forest Land and Resource Management Plan (1990)
The current Deschutes National Forest Land and Resource Management Plan (LRMP) as amended addresses the potential for geothermal exploration and development activity on National Forest lands in this area of Newberry Volcano. As discussed earlier, the BLM issued geothermal leases at Newberry Volcano consistent with the LRMP. Geothermal resource activity is one of the recognized multiple uses of National Forest lands. Any approved geothermal activities associated with the exploration project would be consistent with the LRMP.

National Energy Policy of 2001
In May 2001, the President adopted a National Energy Policy (NEP) to respond to the nation's increasing energy needs. This policy recognizes the importance the federal government's effect on the supply and use of energy. The NEP encourages the use of renewable and alternative energy sources and recommends directing federal agencies to expedite permits and other federal actions necessary for energy related project approvals. The NEP also recommends that the Secretary of the Interior re-evaluate access limitations to federal lands in order to increase renewable energy production. BLM's consideration of this proposal is consistent with the NEP.

Geothermal Steam Act of 1970 and Implementing Regulations
The Geothermal Steam Act of 1970 gives BLM, through the Secretary of the Interior, the responsibility and authority to manage geothermal operations on federal leases. The lessee must pay annual rentals to the federal government, and must expend increasing amounts to have these funds qualify as diligent exploration expenditures. The BLM is to review plans of operation submitted by a lessee for compliance with the Geothermal Steam Act and with other pertinent directives, including Geothermal Resource Operational (GRO) Orders. BLM must also review plans to ensure they comply with other applicable stipulations, laws, and regulations. All operations conducted on geothermal leases are subject to the

approval of the BLM, but if another federal agency manages the surface lands, the BLM must also consult with that agency before approving the plan. BLM's actions to review and consider approval of the applicants POE, and to involve the Forest Service in the process, are consistent with the Geothermal Steam Act and implementing regulations.

Newberry National Volcanic Monument Act of 1990 (Public Law 101-522)
In 1990, over 50,000 acres in the Newberry Volcano area were designated as the Newberry National Volcanic Monument. This Congressional designation restricts geothermal development within the caldera and within the NNVM itself, but provides for geothermal operations to occur outside the Monument's boundaries. The applicants proposed exploration project would occur on lands outside the NNVM and is not in conflict with the Monument, with the legislation, or with the spirit of the legislation that created the NNVM.

Energy Policy Act of 2005 (Public Law 109-58)
The stated purpose of this act is to ensure jobs for our Country's future with secure, affordable, and reliable energy. This act contains several provisions aimed at making geothermal energy more competitive with fossil fuels in generating electricity. The Energy Policy Act recognizes geothermal energy as one of the nation's renewable energy sources for electricity generation. It focuses on expediting and coordinating geothermal leasing and permitting efforts on federal lands, and on assessing geothermal energy potential. It also amends and serves to update the Geothermal Steam Act of 1970 and the Energy Policy Act of 1992. BLM's actions to consider the applicants exploration proposal to obtain additional information about the geothermal resource is consistent with the Energy Policy Act of 2005.

1.7 DECISION TO BE MADE

The District Manager of the Prineville District BLM will make the decision whether or not to approve the applicants POE. As part of the decision, the District Manager will also identify requirements and mitigation measures to be included to minimize environmental impacts during project implementation.

CHAPTER II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 BRIEF OVERVIEW OF THE GEOTHERMAL RESOURCE

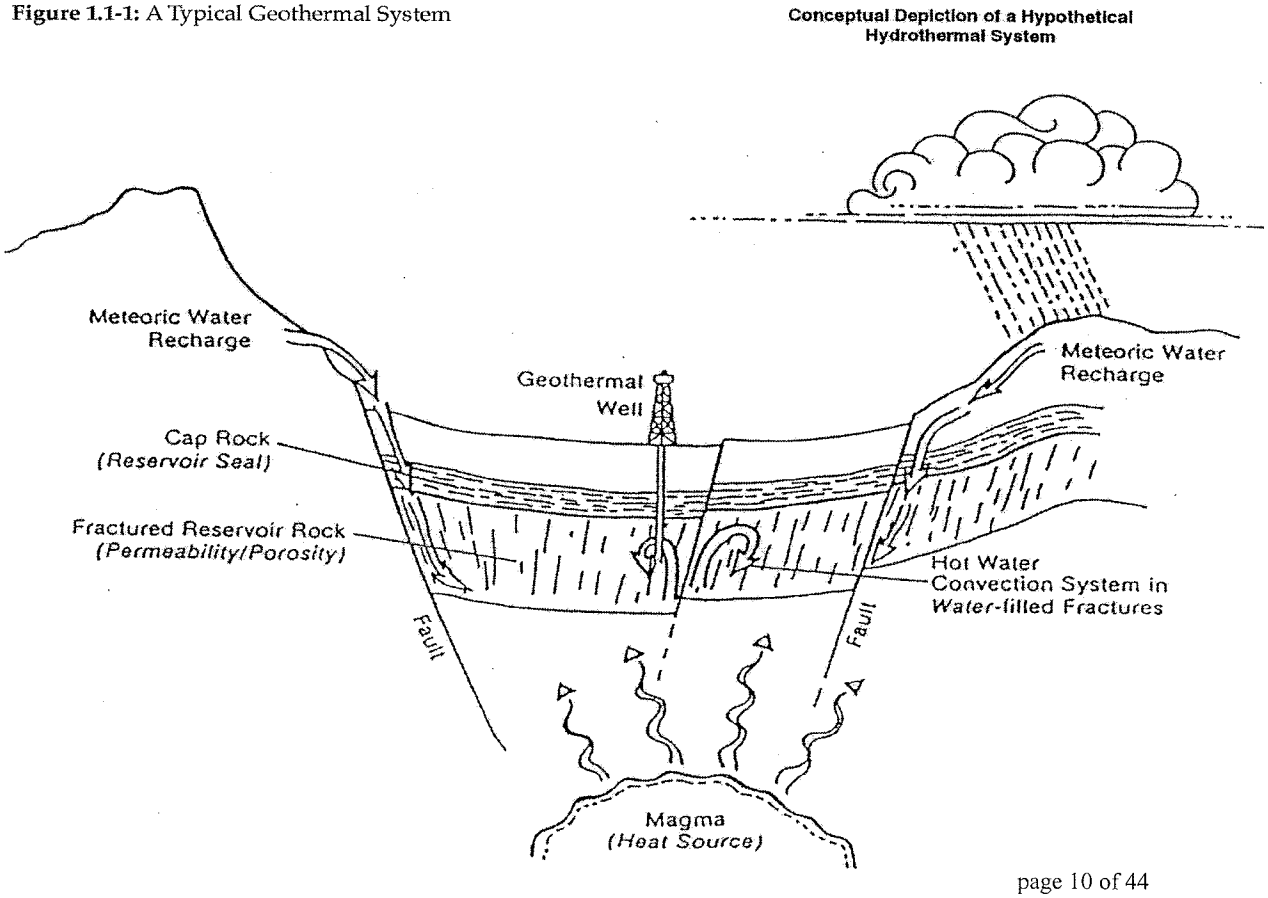
Experience elsewhere in the United States and in other countries has shown geothermal to be a reliable renewable energy source, but it has yet to be developed in the Pacific Northwest. The Deschutes National Forest is one of the few national forests with potential for geothermal energy development. Geologically young volcanoes found in central Oregon suggest that this area may contain some of the best prospects for geothermal exploration in the continental United States. One study at Newberry Volcano estimated the energy potential to be up to 13,000 megawatts, and another study by Bonneville Power Administration estimates a 16,000 megawatt potential.

There has been, and continues to be, considerable interest in the area's volcanic, geologic, and geothermal features. Newberry Volcano is one of the largest volcanoes in the Cascade Range. Although it is now thought to be in a period of quiescence with little or no volcanic activity, its volcanic activity began at least 500,000 years ago, with the most recent eruption occurring about 1,350 years ago.

In 1976, the U.S. Geological Survey (USGS) designated a 49-square mile area of Newberry Volcano, including the caldera, as a Known Geothermal Resource Area (KGRA), which led to the issuing of federal geothermal leases in the area. The KGRA designation is given to areas considered to be good prospects for extraction and use of geothermal resources, and consequently dictated that federal geothermal leases within the KGRA be issued by the BLM using a competitive bid process.

Since the 1970's, Newberry Volcano has had a variety of scientific investigations and studies by scientists and geothermal resource explorers, including government, private industry, and educational disciplines. Near the proposed Project, seven deep wells were drilled in the past to depths of approximately 3,200 to 9,800 feet to assess geothermal potential. These wells identified thermal anomalies with temperatures of up to 600° F. Data suggests that underground temperatures increase with depth and that a heat source indeed exists; however, the amount, properties, or the existence of water or steam have not yet been established in this area. The proposed exploratory wells will seek a hydrothermal system which consists of heat, permeable rock, and water. An example of a conceptual hydrothermal system is shown below.

Figure 1.1-1: A Typical Geothermal System



2.2 FEDERAL AND STATE REGULATORY ROLES

If the POE is approved by the BLM, several federal and state government agencies with regulatory authority will oversee the project's implementation. Surface disturbance and on-the-ground operations will be monitored by BLM and the Forest Service to ensure that terms and conditions of the approval, applicable laws, and regulations are followed. Agencies within the State of Oregon will also be involved, issue specific permits, and have regulatory authority for certain operations that are within their jurisdiction. For instance, the Oregon Department of Geology and Minerals has regulatory authority for geothermal wells and will issue a drilling permit, and the Oregon Department of Water Resources will issue permits for fresh water wells. Federal and state agencies will coordinate with one another and share information and expertise.

2.3 PROPOSED ACTION

The POE proposes to drill exploratory geothermal wells on three well pads within NGC's federal leases on the northwest flank of Newberry Volcano. Each well pad will be approximately 5 acres in size. The locations for the well pads were selected by the applicant based on results of research and geophysical studies to evaluate subsurface geologic structure and features. While most of the surface disturbing activities would occur within the first year, wells could continue to be drilled for up to approximately 2 to 3 years, depending on drilling results. All operations will adhere to federal and state regulations, with oversight by federal and state agencies.

PROJECT LOCATION AND OVERVIEW

The three proposed pads, identified as S-16, S-17, and S-29, are shown on Figure 2.1. The pad locations are all within Township 21 South, Range 12 East, Willamette Meridian, and are further described as follows:

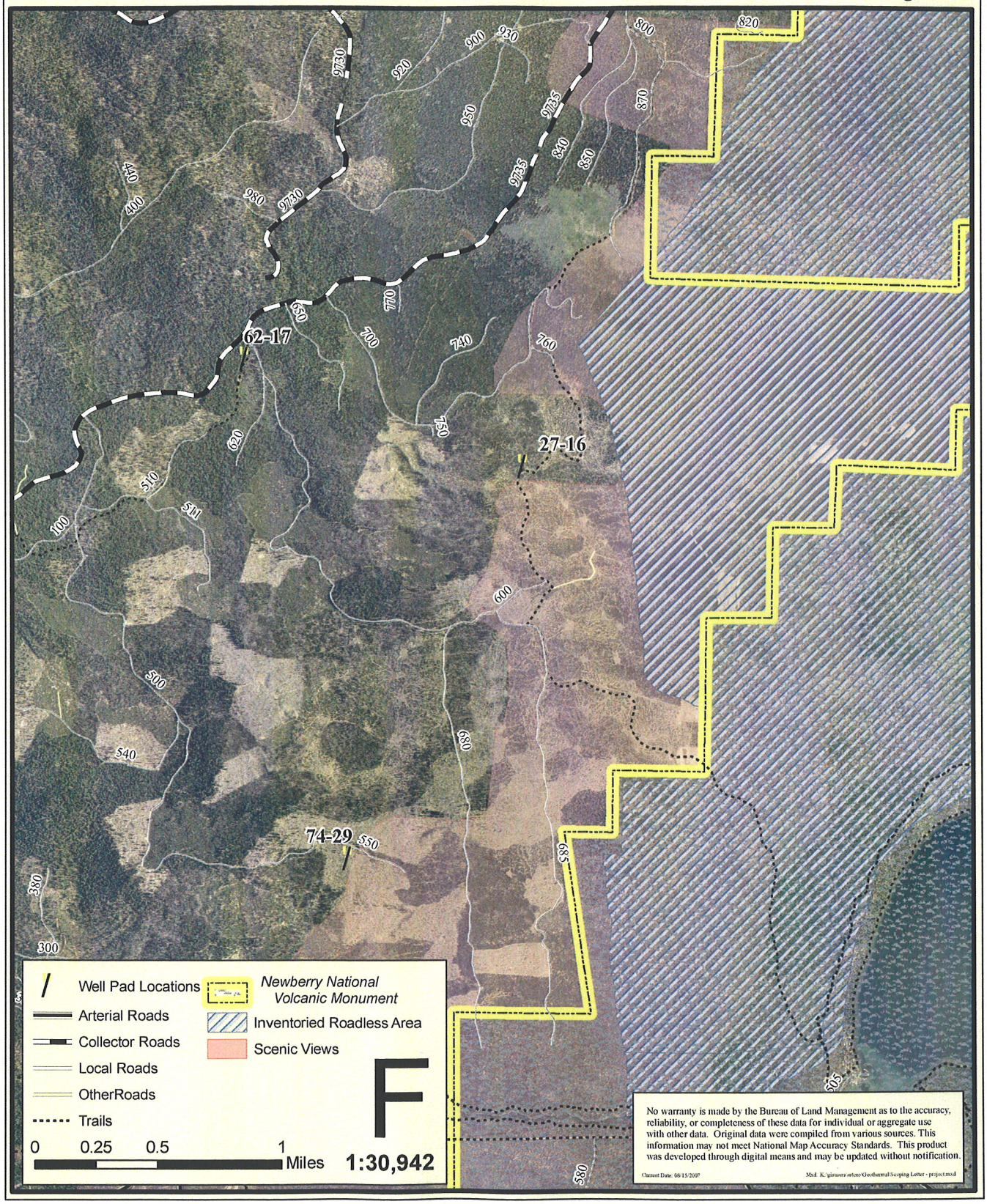
Pad S-16: Section 16
Pad S-17: Section 17
Pad S-29: Section 29

Well pad locations (Figure 2.1) are proposed at sites already disturbed by past forest management activities. All three pad sites are within previously logged areas (including the 1994 Fishhook Timber Sale). One proposed well pad area includes a current timber sale unit identified in the 2007 Lava Cast Environmental Assessment and planned for harvest.

An area approximately 40 acres in size around each well pad will be evaluated as part of this analysis. This larger study area will allow each specific pad location to be adjusted within the 40 acres in order to minimize resource impacts. Areas having the least vegetation, flatter topography, and which are accessible from existing roads will be sought. Final location of the well pad sites will be subject to the approval of the Forest Service and BLM.

Newberry Geothermal Exploration Project

Well Pad Location **Figure 2.1**



ACCESS ROUTES

With the exception of a ½ mile segment of temporary road construction, each well pad will be accessed using existing roads. No new system roads are planned. Primary access to all pads will be via Road 9735, which runs easterly from its intersection with Highway 97. Access needs and proposed routes are very similar to those described and approved in the 1994 Geothermal EIS (Section 2.4.3) for the adjacent Cal Energy project. Forest Road 21 from the Paulina Prairie gravel pit junction to Highway 97 and Highway 97 between Forest roads 21 and 9735 will be used as haul routes for gravel sources. The specific access roads, length in miles from the 9735 Road, and the amount of temporary roads needed for the Proposed Action are shown on Figure 1.2, and summarized in the Table below.

The construction standards of access roads will be suitable to allow safe travel for vehicles and specialty equipment associated with the exploration activity and to provide for the protection of system road beds. Typical vehicles will range from 2-wheel drive pick-up trucks to over-sized tractor trailers specifically designed to carry large drilling rigs and related equipment. Some road segments will require maintenance to accommodate equipment and vehicle use during implementation of the project. This will include brushing for adequate site distance, grading and surfacing, and curve widening to allow for larger vehicles and longer loads. Steep and adverse grades will be reduced and turnouts will be restored or installed to allow oncoming vehicles to safely pass. All listed work is to insure driver safety and to provide needed access for support of the Project. No new roads will be constructed to support this activity, however, there is one temporary road needed to access well pad S-29 that will need to be constructed. This road will be used on a limited basis until future need is determined. If it is determined unneeded, the road will be decommissioned and returned to the land base. Since the exploration activities will occur year-round, roads needed for the project will be snow plowed to allow access to facilities. Maintenance needs are summarized below.

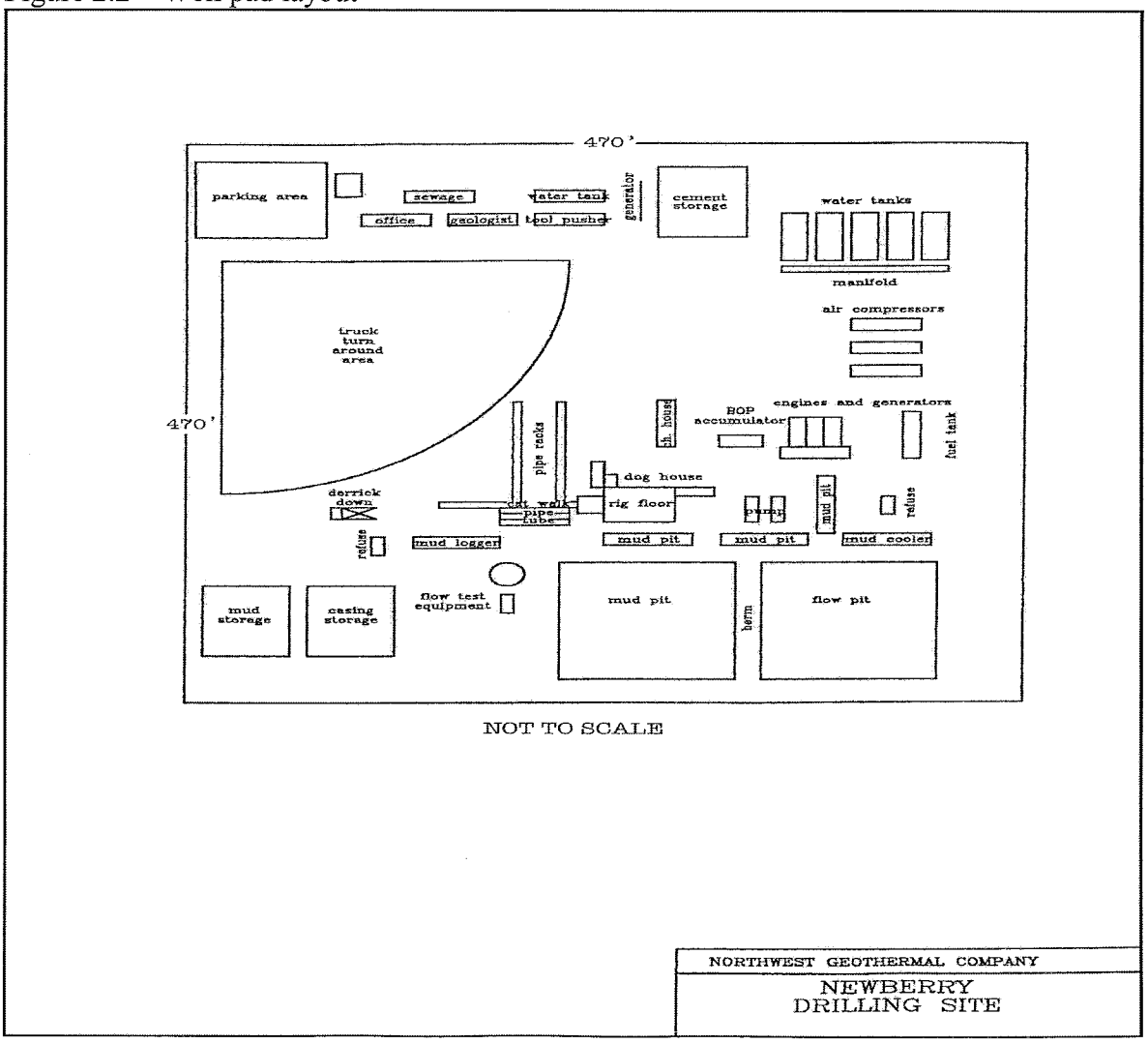
PAD	ROAD NO.	TOTAL MILES	NEW ROADS NEEDED	MAINTENANCE NEEDS
S-16	9735-600 9735-690	~2.0 1.00	None None	Brush, remove trees 1" to 12" Brush, remove trees 1" to 12", cut and fill, install 12" culvert
S-17	9735-600 9735-510	<0.1 0.5	None None	Brush, remove trees 1" to 12" Brush, remove trees, some larger than 12" diameter, cut and fill
S-29	9735-600 9735-680 Temporary Rd. 9735-558	~1.5 1.6 0.5 0.5	None None	Brush, remove trees 1" to 12", Brush, remove trees 1" to 10", cut and fill, install 24" culvert

*Note: All roads listed in the Table above will be accessed from Forest Road 9735, which is approximately 7 miles from the junction of Highway 97 to the junction of Road 600. Some segments of 9735 are in need of resurfacing, blading, shaping and drainage restoration in order to safely accommodate vehicles needed for geothermal exploration. In many areas the aggregate surface has worn off, the roadsides have been encroached by brush, there is no proper drainage, and road surfaces have washboarded.

WELL PADS

Each well pad would be about 5 acres in size, and would require an engineered level surface with compacted fill slopes. The pads will be of sufficient size to safely accommodate drilling activities and related needs, including facilities, vehicles and equipment, storage, personnel, and assembly areas. Up to three geothermal wells, each directionally drilled to reach different underground targets, could be drilled at each pad. Each pad will also have a sump pond that is compacted and lined with clay to hold non-hazardous materials, including water, cuttings, mud, and fluids associated with the drilling process. Fresh water well may be drilled at each pad to provide water for the drilling activity, reducing the need to haul water by truck. A typical geothermal pad layout is shown in figure 2.2. Construction of each well pad will take approximately 2 to 3 weeks, and more than one pad may be under construction at the same time. Drilling of each deep geothermal well will take approximately 50 days of continuous drill work to complete, and more than one well may be drilled at the same time. See pages 2-13 thru 2-26 for additional discussion on the exploration phase from the 1994 Geothermal EIS.

Figure 2.2 – Well pad layout



WATER SOURCES

Drilling geothermal wells requires the use of water to lubricate the drill bit, to help keep the equipment cool during drilling, and to flush cuttings back to the surface. Water for drilling operations would be hauled in by truck from water wells located off-lease on private land, or provided from a water well on the geothermal drill pad. If these water wells are not successful, another location on nearby National Forest land may be needed. If so, the POE would be amended and a request would be submitted to the BLM and Forest Service for consideration. The location for another water well site is not currently known and would be based in part on drilling data from the unsuccessful water wells. Temporary water lines using agricultural irrigation pipe may also be placed on top of the ground to move water to specific locations. Any fresh water wells would be permitted and regulated by the State of Oregon.

GEOTHERMAL WELL TESTING

If after a geothermal well is drilled and there are indications of water or steam at high temperatures, the well would be "flow tested" to evaluate the fluids and determine the potential for production as a viable geothermal energy resource. Flow testing involves specialized equipment, and results in a controlled venting of steam from the well for up to 30 to 45 days on a continuing basis. This is done under the supervision of technical specialists, engineers, and BLM and State geothermal specialists. The equipment on the wellhead includes a series of valves, blowout prevention equipment, and other specialized equipment to ensure a safe testing process.

FIRE PROTECTION AND SAFETY PRECAUTIONS

The pads will be located in relatively open sites without dense or dead vegetation, and a 50-foot buffer area from the surface of the pad will be kept free of vegetation and debris to provide a suitable defensible space for each pad. The pads themselves, each approximately 5 acres in size, will be kept free of vegetation or debris. Fire extinguishers and tools will be on site at all times and in each vehicle. Water will be stored and available for fire use at each pad. The Project will follow fire precaution standards and requirements provided by the Forest Service for industrial operations, such as those used for timber sale operations. Communication will be maintained and emergency services contacted in the event of any emergencies.

During certain times, such as flow testing, construction activities, movement of equipment, or other specific activities, all or part of the well pads and some portions of access roads will be gated, posted and/or temporarily closed to ensure public safety and avoid situations involving unannounced visitors.

ABANDONMENT AND SITE RESTORATION

If a producible geothermal resource is not found, and/or it is determined by the BLM and Forest Service that a well pad or road segment constructed specifically for the Project is no longer needed, those sites will be restored. Wells will be properly plugged and abandoned,

all equipment and materials will be removed, sites will be recontoured to their original positions, and disturbed areas will be restored and revegetated to conform to the surrounding landscape.

Restoration and revegetation will be completed by the applicant, in accordance with BLM and Forest Service direction and specifications at the time restoration is needed. Any temporary roads constructed for the Project would be subject to restoration, but existing Forest roads would remain for other Forest uses.

OTHER CONNECTED ACTIONS

- Some of these access roads are used for snow mobile trails in the winter, as a result 8 miles of existing snow mobile trail will be reconfigured for the duration of this project. This will require brushing approximately 1.5 miles of existing road and creating 2.0 miles of new trail by brushing a route cross country.

- Rock that will be used to upgrade these roads will come from Prairie South pit which will be re opened for this project. Location of this pit can be seen on figure 1.2

MEETING THE PURPOSE AND NEED

The Proposed Action fully meets the Purpose and Need in the following ways:

- The Project would perform geothermal exploration activities to acquire more information about geothermal resources at Newberry Volcano. This would occur on two of the federal geothermal leases held by Northwest Geothermal Company, with Davenport Power LLC as the Operator. The Project would also provide an opportunity to acquire more scientific data and update existing geology, volcanic, and geothermal information for the Newberry Volcano area.
- This proposal gives the Bureau of Land Management the opportunity to fulfill national direction and obligations of the National Energy Policy and the Energy Policy Act of 2005, related to promoting the development of geothermal resources on public lands.
- Through this Environmental Assessment and cooperating efforts to include the Deschutes National Forest as the surface land management agency, BLM will meet the requirements of the Federal Land Management Policy, the National Forest Management Act, and the Newberry National Volcanic Monument Act by only approving activities that are consistent with these federal actions.
- This Project will assist the State of Oregon in helping to fulfill its objectives of encouraging, promoting, and developing new renewable energy resources.

2.4 NO ACTION

Under the No Action alternative, the proposed geothermal exploration activities in the POE would not be approved. Analysis of this alternative is required by the National Environmental Policy Act to establish a basis from which to evaluate the relative impact to the environment of implementing the proposed action.

If this alternative were selected, no well pads or exploratory drilling would occur, the access roads would remain at their current or appropriate maintenance level, and none of the connected actions would be authorized by this decision.

MEETING THE PURPOSE AND NEED

The No Action alternative would not meet any elements of the Purpose and Need:

- With this action no additional information would be acquired regarding the geothermal resources, and there would be no opportunity to gain further knowledge about the volcanic and geologic features of the area.
- With this action the BLM would not be fulfilling its national direction and responsibilities from energy policies and laws to promote and develop geothermal resources on public lands.
- With this action the BLM would not be carrying out the intent of the federal geothermal leases issued in 1983 which allows the lease holder to pursue geothermal activities on these lease areas.
- With this action the State of Oregon's need for renewable energy sources will not be addressed in part.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

The BLM considered whether other alternatives could address the proposed POE, whether any other alternatives would be significantly different or have significantly different effects, and whether there would be a reasonable need to evaluate other alternatives. Upon satisfactory review of the technology, operations, and equipment proposed in the Plan, BLM did not identify other alternatives that would meet the purpose and need.

CHAPTER III. AFFECTED ENVIRONMENT

This chapter describes resources that could potentially be affected by the Proposed Action, and provides information to characterize the project area. This chapter details the existing situation and provides baseline information to evaluate alternatives and describes the No Action Alternative.

3.1 LAND USE

The 1990 LRMP as amended and Management Area (MA) allocations guide all Deschutes National Forest management and activities, including geothermal development. NGC's two geothermal leases are located in areas of the within General Forest and Scenic Views MA allocations. Approximately 350 acres of federal geothermal lease # 40497 are within the General Forest MA, and 255 acres are within the Scenic Views MA. For lease # 12437, approximately 862 acres are in General Forest, and 422 acres are in Scenic Views.

All three proposed well pads are located within the General Forest allocation, and all proposed access routes to the well pads are within the General Forest allocation, except for the access road to well pad S-29, which falls within the Scenic Views area (Figure 2.1).

The General Forest Management Area has a goal of emphasizing timber production. It allows for geothermal use, but provides that stipulations be used when needed to protect wildlife habitat and recreation areas. The Scenic Views Management Area has a general goal of providing Forest visitors with high quality scenery that represents the natural character of central Oregon. Most of the standards and guidelines for Scenic Views deal with timber management because the scenic resource is most often affected by timber harvest and resulting vegetation changes in the landscape.

One of the general objectives of the Scenic Views designation is that to the casual observer, results of activities either will not be evident or will be visually subordinate to the natural landscape. More specifically, LRMP standards and guidelines provide for mineral development in Scenic Views if the facilities and improvements are located, designed, and maintained to blend with the characteristic landscape. The LRMP recognizes that scenery management objectives may not always be met when the viewer is within the project site. Scenic Views standards and guidelines also allow for trees to be removed where necessary for access to geothermal sites.

Both of NGC's federal leases are located within the Newberry Known Geothermal Resource Area (KGRA). The LRMP addresses the KGRA, featuring a goal of providing for exploration, development, and production of energy resources where development of the geothermal resource is compatible with other resource values. The LRMP makes the assumption that exploration will require ground and vegetation disturbance and allows for development if exploration confirms that a viable geothermal resource exists in a leased area. The LRMP further states that geothermal exploration and development would have to be managed in accordance with LRMP direction for the General Forest and Scenic Views allocations, and recognizes that one or two geothermal power plants with 10 to 30-megawatt capacity may likely be developed on the Forest.

3.2 NEWBERRY NATIONAL VOLCANIC MONUMENT

The Proposed Actions are located on National Forest lands outside and west of the nearby NNVM, which covers more than 50,000 acres. Refer to Figure 2.1. The Newberry National Volcanic Monument Act, approved on November 5, 1990, established the area as a National Monument and provides the basis for future management of the lands within its boundary. This legislation was created from a local grassroots effort in recognition of the unique geologic and volcanic features of the area, as well as the potential for development of the geothermal resources in and around the Monument area. The Monument Act resulted from consensus reached by a 30-member "Monument Committee" representing a wide range of interests with a common vision for a National Monument at Newberry Volcano. The Committee included representatives from environmental groups, timber industry, geothermal interests, local and federal governments, and recreation groups.

Provisions from the Monument Act include that there will be no geothermal lease activity on Federal lands within the Monument's boundaries. However, nothing in the Monument Act precludes geothermal activities outside the boundary, and there are no protective perimeters or buffer zones established around the NNVM. "The fact that activities or uses outside the Monument and Special Management Area can be seen, heard, measured, or otherwise perceived from within the Monument and Special Management Area shall not, of themselves, limit, restrict, or preclude such activities or uses up to the boundary of the Monument and the Special Management Area", (Sec. 8(a), Public Law 101-522).

3.3 FOREST VEGETATION

Vegetation within the lease areas is generally typical of the lodgepole pine types found in the Deschutes National Forest. The sites are primarily within lodgepole pine plant associations, with some ponderosa pine trees and white fir present. Well pad S-16 is in a previously harvested lodgepole pine area, with young lodgepole pine saplings now dominant in the area. Well pad S-17 has more ponderosa pine trees present, mostly sapling and small diameter sizes, with some larger trees are in the area. Well pad S-29 is in a previously harvested lodgepole pine site currently dominated by young lodgepole, with some white fir and ponderosa in the area.

Lodgepole pine forest stands in the general vicinity have suffered considerable mortality due to mountain pine beetle infestations, as the common denser and older lodgepole stands were particularly susceptible to such infestations. Two timber sales, the Fishhook Timber Sale and the earlier North Peak Salvage Sale, along with post-sale activities, have occurred throughout the area within the past ten to twenty years. The Lava Cast Project was recently approved, and will conduct thinning of ponderosa pine stands and reduction of fuel hazards in the area.

In order to minimize any new disturbance, well pad locations are mostly proposed to be sited in areas that served as log landings during previous logging activities, are accessed by existing roads, and where vegetation is sparse or relatively newly reforested. Refer to Figure 1.2.

No noxious or invasive weeds were found within the proposed project area. A Noxious Weed Risk Assessment has been prepared to evaluate the potential risk from the Project for introduction or spread of noxious weeds into the area, and is on file at the BLM Prineville Office. This was prepared in accordance with the 2005 Record of Decision for Preventing and Managing Invasive Plants, which amends the Forest's LRMP and applies to this Project.

3.4 CULTURAL RESOURCES / HERITAGE RESOURCES

The cultural resources in the general project area consist primarily of archaeological evidence of short term and intermittent prehistoric use and the archaeological traces of timber harvesting in the first half of the 20th century.

Some of the oldest archaeological sites in North America occur in central Oregon. The deeply buried structural features found at the Paulina Lake site date to about 10,000 to 9,500 years ago. In the general project area, however, such very ancient sites can only be found below the pumice and ash fall deposits from the Mt. Mazama eruption. Nevertheless, there is considerable evidence of prehistoric use of resources and land.

The known prehistoric sites within and near the general project area do not include permanent or even long-term settlements, a reflection in part of the absence of surface water. Instead the sites suggest the area was used for procuring resources and as a travel corridor between the Deschutes River and the obsidian sources at Newberry Crater. During the past 7,700 years, the environment in the project area has cycled through major climatic changes, so the prehistoric record will yield information about how subsistence and technology changed in response to those climatic shifts. Site types that may be revealed by future inventory include single and multicomponent lithic deposits, cache sites, crevice burials, vision quest cairns, utilized lava tubes, and culturally scarred trees among old growth ponderosa pine. Of particular concern are prehistoric sites, which are buried within ash deposits from eruptions at Newberry Crater. Such sites typically are not revealed through surface survey.

Western expansion of Euro-American population began to affect traditional cultures in the general project area by at least 1850, but the biggest impact to the area's resources came as a result of the logging industry. By the mid-1920's, railroad tracks extended from Bend south to La Pine and from that vicinity railroad logging systems radiated to the east and north into the general project area. Railroad logging was one of the seminal formative institutions behind the early economic growth of central Oregon. Railroad grades are known to be situated within the general project area and associated camps and dumps may be as well.

Some archaeological field surveys have been conducted within and near the general project area. However, almost no prior surveys have been conducted within the footprint identified for the specific well pads for this project. Thus undiscovered and unrecorded cultural resources were expected to be found within the general project area, although not necessarily where the proposed exploration activities will occur.

Three 40-acre units were completely and intensively surveyed in order to identify the presence of cultural resources of the types described above. Access roads were surveyed from Forest Road 9735 to the individual 40-acre units. Four prehistoric sites were discovered during the cultural field surveys. It is expected that buried prehistoric deposits remain undiscovered within the general project area.

During the environmental analysis for the 1994 Geothermal EIS, the Forest Service consulted with the Klamath Tribes and the Confederated Tribes of the Warm Springs Reservation regarding possible concerns and issues they may have with traditional cultural properties in the area. Neither the consultation process nor the field surveys conducted at that time revealed any issues or cultural properties of concern within the more extensive study area.

3.5 WILDLIFE

A Wildlife Resources Report has been prepared for the proposed Project to document the assessment of potential impacts to wildlife species in accordance with standards for the Deschutes National Forest. A copy of the report is on file at the BLM Prineville District Office. Management Indicator Species, focal species, and Priority Migratory Bird Species of Concern were considered in the report. The report found that there is suitable habitat or potentially suitable habitat in or near the proposed project area for Cooper's hawk, northern goshawk, sharp-shinned hawk, red-tailed hawk, northern flicker, hairy woodpecker, and flammulated owl. The general vicinity of the Project is used mostly during spring, summer, and fall by mule deer and rocky mountain elk, and these species do occur in the area.

A Biological Evaluation was prepared in accordance with the Endangered Species Act of 1973 to determine the potential effects on proposed or listed sensitive, threatened, or endangered wildlife species. The BE determined that there are no proposed species of concern identified for this area. The BE also determined that no threatened, endangered, sensitive, or candidate species are likely to occur in the area, nor is there any suitable habitat for these species in or near the Project area. The wildlife BE is on file at the BLM Prineville Office.

3.6 WATER RESOURCES

There are no natural surface water sources or riparian areas on or near the leases. The only natural surface waters found in or near the area are to the south and east of the proposed Project, and include East Lake and Paulina Lake in the Newberry Caldera, and Paulina Creek, which drains out of Paulina Lake.

Most rain or snowmelt in the project area percolates directly into the ground, as the soils are very permeable and comprised of volcanic rock materials. The west flank of the Newberry Volcano is underlain by interbedded lava flows and sediments, with groundwater zones likely occurring in rubble zones. The maximum depth of fresh water zones is estimated to be about 2,000 feet below the surface. It is expected that the geothermal hot water resource sought by exploratory drilling will be found at approximately 10,000-foot depths. Pages 3-14 thru 3-28 of the 1994 Geothermal EIS have more information on the hydrology of this area.

3.7 FOREST RECREATION

There are no developed recreation sites in the lease areas; however there are a number of designated and groomed snowmobile routes that utilize some of the access routes. With the exception of snowmobiling, the immediate area around the proposed well pads receives an unknown amount of recreational use during the summer. Recreation use in the general area is dispersed and likely incidental as there are no recreational developments to specifically draw users to the lease area. There is nothing in particular that distinguishes these sites from those in the vicinity or elsewhere on the northwest flank of Newberry Volcano. The lack of water sources or features may also further limit recreational use.

Recreational activities in the general area, which could include the well pad areas, likely includes elk and deer hunting in the late summer and fall seasons, recreational use of the roads and snowmobile trails by horses, mountain bikes and off highway vehicles, and use by four-wheel drive vehicles for backwoods driving. Trails in the project are shown on Figure 3.1

3.8 ROADS

There are numerous Forest Service roads in and around the project vicinity that were constructed and maintained for forest management, timber sales, recreation access, and general public or commercial uses. All of the existing system roads to be used to access the proposed exploration project are within the area previously analyzed and evaluated in the 1994 Geothermal EIS (Section 2.4.2.3) as most of the roads also provided access for the Cal Energy project. The road locations and needs for this POE are very similar to those considered in the 1994 Geothermal EIS, although the roads have deteriorated and have not been maintained over the last several years. The proposed Project is not within any inventoried roadless areas.

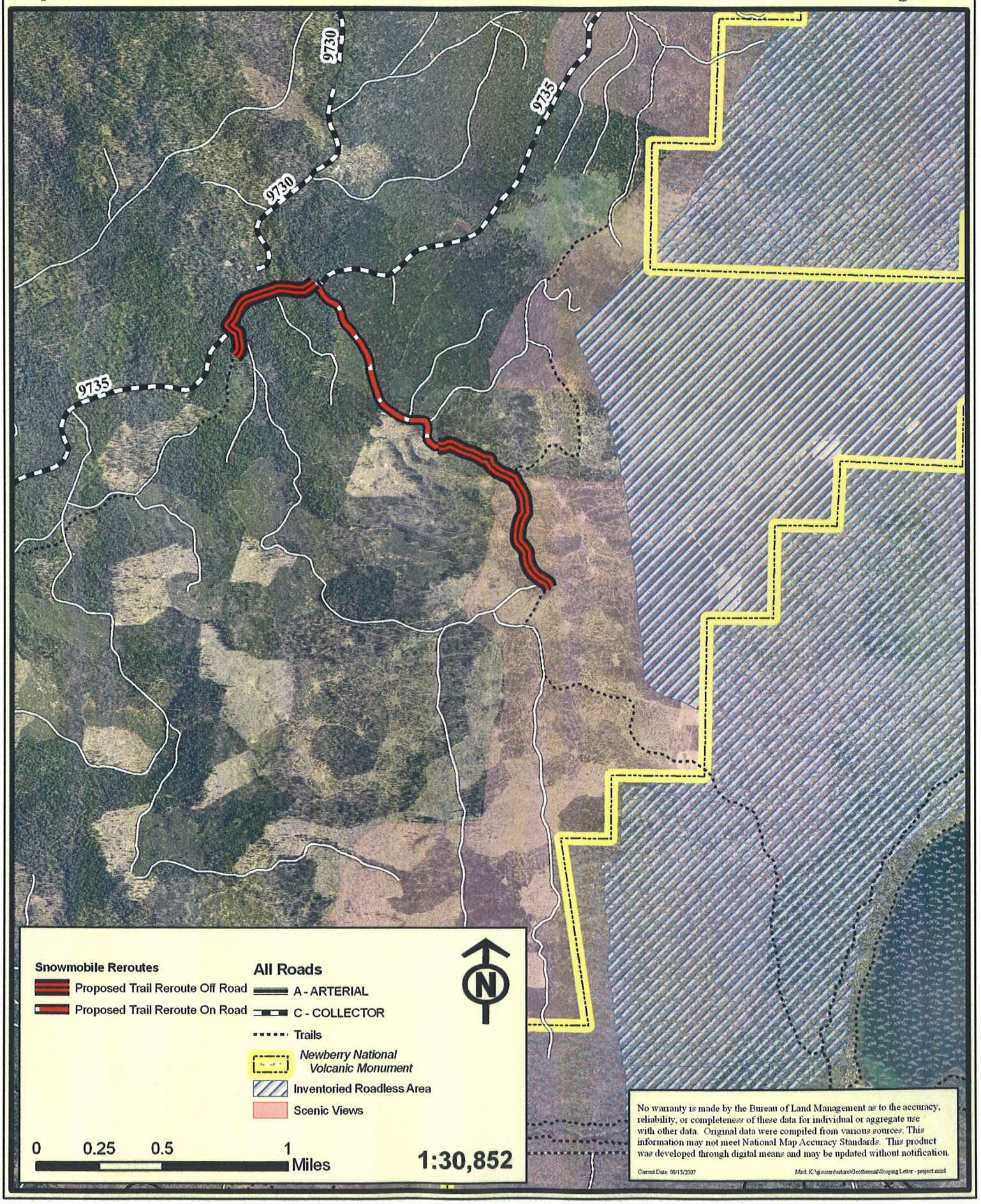
Road 9735 is a 1½-lane mostly aggregate surfaced road that would provide the main access to the project area. From its intersection with Highway 97 to the junction with Road 600, it is about 7 miles in length. This road is a maintenance level 2 road currently maintained as a high clearance vehicle road which typically may or may not be suitable for passenger car use. Due to a decrease in maintenance funding this road, which was routinely maintained in 1994, is now maintained on a limited basis. Some segments are in need of resurfacing, blading, shaping and drainage restoration in order to safely accommodate vehicles needed for geothermal exploration. In many areas the aggregate surface has worn off, the roadsides have been encroached by brush, drainage has been impaired, and the road surface is washboarded.

The roads leading to the three proposed well pads are native surface roads with some limited areas of cinders or rock. These roads are generally not maintained or encouraged for passenger car use and are being encroached by roadside vegetation. They are usable by high clearance vehicles, but segments would not be adequate in their current condition for exploration vehicle traffic. These roads will need an all weather surface to allow access during winter conditions.

Access to the S-17 well pad site will be via 0.1 miles of Road 600 and approximately 0.5 miles of road 510. Access to the S-16 pad site will also be from Road 600, and will involve approximately 2 miles on Road 600 and 1 mile on Road 690. The S-29 pad will be accessed by approximately 1.5 miles of Road 600, 1.6 miles of Road 680, 0.5 miles of an unnamed road, and 0.5 miles of Road 558. These routes would provide the safest and most direct access, would require the least amount of road maintenance and would not require any new system road construction. Additionally, Forest Road 21 from the Paulina Prairie gravel pit junction to Highway 97 and Highway 97 between Forest Roads 21 and 9735 will be used as haul routes for gravel sources. Refer to Figure 1.2 for locations of access roads.

Newberry Geothermal Exploration Project

Proposed Snowmobile Trail Reroute Locations **Figure 3.1**



3.9 SCENIC RESOURCES

None of the well pads are within the Scenic Views Management Areas identified by the Deschutes National Forest LRMP (Figure 2.1). Only portions of Roads 600, 680, and 558 accessing well pad S-29, totaling about 2.6 miles in length, fall within this designation. All of these roads have been in place for quite some time. These roads were primarily used for logging and timber sale operations, and/or used or analyzed and approved for use in conjunction with the 1994 Cal Energy geothermal project.

Most of the areas in and around NGC's geothermal leases are not visually unique to the northwest flank of Newberry Volcano, nor do they possess distinctive visual attributes. If the general area is viewed from a distance or from an aerial position, the dominant feature is the timber harvest pattern of the forest vegetation. Refer to Figure 2.1.

A detailed visual analysis was conducted for the 1994 Geothermal EIS (Section 3.6), in which the nearby, but much larger Cal Energy project, was analyzed, and a more extensive study area was evaluated.

3.10 GEOLOGY, SOILS, AND MINERALS

The proposed well pad sites are located on the west flank of Newberry Volcano, a 500-square mile shield volcano that is less than 500,000 years old. Cinder cones are prevalent along the volcano's flanks. The most recent volcanic event occurred merely 1,350 years ago, and overlie the Mazama Ash from the eruption 70 miles to the south that formed Crater Lake 6,700 years ago. Newberry Volcano appears to be in a period of dormancy and major periods of volcanism are not anticipated. Thermal features, voluminous silicic volcanic rocks and a history of young volcanism make Newberry Volcano attractive for geothermal exploration.

Late Quaternary basaltic lavas, cinders, and unwelded as-flow deposits underlie the proposed well pad sites. The lava flows are variously rubbly, blocky, and dense, and are not significantly eroded. Permeability of the soils and lava is high and even during high intensity storms or rapidly melting snow, surface water infiltrates soils and lava at a rapid rate, minimizing any opportunities for surface water flow. Slopes in the vicinity of the proposed well pads are mostly gentle, naturally stable, and potential for mass movement in the area is very low. Newberry soils are derived from erosion, decomposition of organic material, and reworking of ash, pumice, tuffs, and lava flows, and tend to be cohensionless, uncompacted, easily excavated, and highly permeable.

There are no known commercial deposits of minerals or precious metals in the leased area, and there are no mining claims. Cinders and lava continue to be quarried from the region for public and Forest road surfacing projects. There are about 60,000 acres on Newberry Volcano under federal geothermal leases issued by the BLM, and the area is considered one of the best prospects for geothermal resources in the nation.

3.11 NOISE

There are no noise sensitive properties, such as where people sleep or gather, in or near the project area. The proposed well pad sites are more than 4 miles from Paulina Peak and 2½ miles from Paulina Lake Campground, which would be the closest developed recreation sites. Generally, any Forest management activities would not be heard unless someone is in the immediate area. Activities that have or may occur in the area tend to be those that produce noise, such as timber harvest, firewood cutting, snowmobile use, and vehicle travel. More discussion regarding noise can be found in the 1994 Geothermal EIS, pages 3-42 and 3-43.

3.12 AIR QUALITY

The proposed Project is located in a rural remote forest setting, absent of substantial air pollutant emissions. Forest Service manages the area for general forest products or recreational uses. Principal man-made sources of air particles are wind-blown dust from unsurfaced roads or other disturbed areas void of vegetation, vehicle exhaust emissions, and smoke or particulate matter from prescribes burns or wildfires. This existing situation is not unique, and is typical of this type of area found in the general region and throughout other National Forests in Oregon. The area is in attainment of all air quality standards. Additional discussion on air quality can be found in the 1994 Geothermal EIS, pages 3-30 thru 3-37.

CHAPTER IV. ENVIRONMENTAL EFFECTS

This chapter describes the expected environmental effects of implementing the Proposed Action and the No Action alternatives, and provides the scientific and analytic basis for their comparison. This chapter is organized by subject, in the same order as described in Chapter III, Affected Environment.

Most, if not all, of the environmental effects addressed here were considered in the 1994 Geothermal EIS (Sections 3 and 4) for the Cal Energy project, for which resource study areas evaluated and encompassed extended areas, incidentally including the NGC lease areas. The Cal Energy project was greater in scope, involving a larger exploration operation and addressing the long-term development, production and transmission of electrical power. As such, much of the environmental analysis completed for the 1994 Geothermal EIS can be applied to the analysis for this project proposal. Although NGC's leases are located just to the west of the Cal Energy leases, the primary differences between the two are the narrower focus and shorter duration of this proposed project. As stated in Chapter I, this EA will references the 1994 Geothermal EIS and incorporates those findings where they are the same (location, activity, and/or effects). Applicable mitigation measures from the Record of Decision for the 1994 Geothermal EIS were also incorporated as appropriate (Section 4.18 below).

In addition to these mitigation measures, the Proposed Action alternative incorporates the required mitigation measures specified in Section 4.19 of this EA as well as any required mitigations included in the incorporated Biological Evaluations and specialist reports.

4.1 LAND USE

Under the Proposed Action, the Project would be implemented in accordance with the direction, goals, and standards and guidelines for the General Forest and Scenic Views Management Areas in the Deschutes National Forest's Land and Resource Management Plan. Three well pads, each approximately 5 acres in size, would be located in the General Forest MA.

The proposed activities to assess geothermal resources are consistent with the KGRA designation and would provide more information for USGS regarding the KGRA features. Under the No Action alternative, the KGRA designation would be maintained, but no additional information about the geothermal resource would be made available.

Under both Alternatives, the land use designations would remain the same and continue to guide National Forest management and activities in the area. Under the No Action alternative, the proposed geothermal drilling activity would not occur.

4.2 NEWBERRY NATIONAL VOLCANIC MONUMENT

Neither the Proposed Action nor the No Action alternatives would have any direct or indirect effects on the Newberry National Volcanic Monument. The proposed project would be located entirely on National Forest lands outside and west of the NNVM boundary. The Proposed Action is consistent with the Newberry National Volcanic Monument legislation. The intent of the legislation was to allow and provide for geothermal exploration outside of the Monument boundary, and to preserve and protect the remarkable geologic landforms within the NNVM.

4.3 FOREST VEGETATION

Under the Proposed Action Alternative, vegetation would be cleared from approximately 5 acres of land at each well pad site. The vegetation removed would be mostly small lodgepole pine trees, shrubs, and grasses typical of the plant associations in that area but could include larger diameter ponderosa pine. Since there is some flexibility in the final siting of the well pads, adjustments will be made where possible to avoid larger trees and to minimize the vegetation disturbance. The well pads will be purposely sited in areas with the least vegetation, such as skid roads, landings, and sale units from past timber sales.

Any merchantable material removed as a result of this project will be accounted for (species, size/volume) and sold following Forest Service procedures. Brush, small trees, and debris will be buried, chipped, removed, or otherwise disposed of according to direction from the BLM and the Deschutes National Forest.

The existing roads used for access will have encroaching vegetation removed from the roadsides to allow safe transportation of equipment. The applicant will be required to complete approximately 15 miles of road maintenance to Forest Service standards. Where roads need to be widened to provide turnouts or where a wider turning radius needs to be created on a curve, small areas of vegetation will be removed to widen the roadbed area. The vegetation removed will only be what is necessary to safely accommodate vehicles associated with the project.

A Biological Evaluation (BE) was prepared to document consideration of proposed, threatened, endangered or sensitive (PETS) plant species, in accordance with policy and direction for the Deschutes National Forest. The BE findings concluded that no PETS are found in the project area, nor are there any high-probability PETS plant habitats; therefore there will be no effect to any proposed, endangered, threatened, or sensitive plant species. The BE is in the Project file at the BLM Prineville Office.

Although no noxious or invasive weeds were found within the proposed project area, the Noxious Weed Risk Assessment found that the Project poses a high risk for introduction or spread of noxious weeds due to the use of equipment that will be brought in from other areas or from sources used to acquire gravel, rock, or fill material. In order to prevent the spread of noxious weeds into the project area, the applicant will be required to take precautionary measures to ensure that equipment coming to the site, and particularly onto disturbed areas, are weed-free. Machinery involved in vegetation removal and land clearing activities will first be washed, and all gravel and rock will come from certified sources and will be certified as weed free by the Forest Service. Additionally, the applicant will be required to monitor the project site to ensure that weeds do not become established within the project area. (See mitigation measures included in Sections 4.18 and 4.19 below and the Noxious Weed Assessment for Davenport Geothermal Exploration Project for detailed operator requirements).

Under the No Action alternative, there would be no change to the existing vegetation. There would be no clearing of any vegetation for well pads, and there would be no clearing of any encroaching brush along existing roads. There would be no effect on any PETS plant species. There would still be opportunities for noxious weeds to spread into the general area from vehicles or other vectors, but these would less likely be associated with geothermal exploration as a result of implementing the required mitigations.

4.4 CULTURAL RESOURCES / HERITAGE RESOURCES

Cultural resources can be impacted primarily by activities which cause disturbance to the ground surface. These activities can include grading and excavating such as are proposed for well pad development and the maintenance of existing roads to a higher standard. However, cultural resources are local and limited in size, thus impacts can be avoided by considering known cultural resource locations during project design and by incorporating monitors where subsurface deposits are expected.

Two of the four discovered prehistoric sites are situated within a 40-acre area proposed for well pad siting. These two sites will be avoided during pad development, during exploratory operations, and during abandonment. The two remaining sites are situated along and within existing roads. These sites will be avoided by either minor re-routing of the existing roads around the sites, by encapsulating the sites or by retrieving the materials from the sites prior to any ground disturbing activities.

By avoiding impacts, the project will culminate in a "no historic properties affected" determination. With such a determination, the project falls within the scope of Regional Programmatic Agreement for implementation of Section 106 of the National Historic Preservation Act, and does not require consultation with the State Historic Preservation Office.

4.5 WILDLIFE

According to the wildlife Biological Evaluation, the proposed Project would not affect or adversely impact any proposed or listed threatened, endangered, or sensitive wildlife species, as these species do not occur in the project area and there are no suitable habitats in or near the project area.

The Project's possible effects to wildlife species are described in the Wildlife Resources Report for the Newberry Geothermal Exploration Drilling Project, FY2007 and in accordance with the Deschutes National Forest LRMP as amended. The report contains detailed analysis of the proposed action relative to wildlife species that use the area and provides recommended mitigation measures which are included in this EA as required mitigation. A summary of key findings for Management Indicator Species is listed below:

- Cooper's hawk – The proposed action would directly affect up to 1.2 acres of potentially suitable nesting habitat and indirectly impact approximately 19 acres of potentially suitable nesting habitat. Cumulative effects analysis determined that the Project would not adversely affect the Cooper's hawk population.

- Northern Goshawk – Direct, indirect and cumulative effects are similar to those described for Cooper's hawk above.

- Sharp-shinned hawk - The proposed action would directly affect up to 1.2 acres of suitable nesting habitat and indirectly impact approximately 19 acres of suitable nesting habitat. Cumulative effects analysis determined that the Project could impact the sharp-shinned hawk population by eliminating the viability of one sharp-shinned hawk nest site.

- Red tailed hawk - The proposed action would directly affect up to 2.4 acres of potentially suitable nesting habitat and indirectly impact approximately 5 acres of potentially suitable nesting habitat. Cumulative effects analysis determined that the Project would not adversely affect the red-tailed hawk population.

- Northern flicker - The proposed action would directly affect up to 2.4 acres of potentially suitable nesting habitat and indirectly impact approximately 2.4 acres of potentially suitable nesting habitat. Cumulative effects analysis determined that the Project impacts would be minimal.

- Hairy Woodpecker – The proposed action would directly affect up to 1.2 acres of potentially foraging habitat. Cumulative effects analysis determined that the Project would not adversely affect the hairy woodpecker population in the short-term and would improve habitat in the long-term.

- Three-toed woodpecker; white-headed woodpecker; Williamsons sapsucker; black-backed woodpecker – There are no anticipated direct, indirect or cumulative impacts to any of these species.

- Rocky mountain elk; mule deer – Approximately 18.6 acres of big game hiding cover would be removed as a result of the proposed action. There would not be any measurable cumulative effects.

- Flammulated owl - The proposed action would directly affect up to 2.4 acres of potentially suitable habitat and indirectly impact approximately 114 acres of potential foraging habitat. Cumulative effects analysis determined that the Project would not adversely affect the flammulated owl population.

An extensive detailed wildlife habitat analysis was also completed for the 1994 Geothermal EIS (Sections 3.12 and 4.12); it remains valid, and is used as a reference for this Project. Observations during implementation of the earlier Cal Energy geothermal project showed that water storage facilities and sump ponds created no added risks to wildlife in the area. Monitoring by Forest Service and BLM during construction, drilling, and exploration operations did not find that any birds, nests, small mammals, or big game animals were adversely affected. Once drilling commenced, personnel on the well pads often saw and reported a variety of birds and animals in the area, indicating that some wildlife species were not threatened by on-going operations.

4.6 WATER RESOURCES

Under the Proposed Action alternative, no surface water resources or riparian areas will be used or affected. The well pads are more than one to two air miles from any body of surface water. Fresh water will be used in the drilling operations, but will either be trucked in or will come from water wells at depths expected to be approximately less than 1,000 feet deep. All water wells will be permitted according to state regulations. The subsurface fresh water zones will be protected from geothermal drilling as the geothermal wells will be enclosed in casing resulting in no adverse effects to ground water resources. If it is necessary to pipe fresh water for use on the well pads, temporary above-ground pipelines would be used, similar to those used for agricultural irrigation systems and similar to those used at the Cal Energy project. Water and liquids on the well pads will be properly

managed and held in tanks or sump ponds so that no run-off or drainage from the pads will occur. Sump ponds consist of clay-lined open ponds with a capacity designed to handle the number of wells at each site. Waste waters as well as any stormwater runoff from the well pads would be stored in the lined sumps.

Under the No Action alternative, there would be no use of water and no effects on water resources. There would be no change to any existing water resource.

4.7 FOREST RECREATION

The Proposed Action is not expected to have any substantial effect to dispersed recreation activities that may incidentally occur in the area. During hunting seasons, the applicant will post signs on roads leading to the project to let hunters know that industrial operations are taking place. Hunting opportunities within and adjacent to the well pad sites are likely to be reduced because of active operations and the presence of project personnel. During the winter season, signs may also be posted at appropriate sites to notify snowmobilers that operations are occurring. Due to drilling activity occurring during the winter snowmobile season, active snowmobile trails will be relocated for the duration of the project. This will include relocating the parts of the existing trail on Forest road 9735 (figure 4.1) to Forest road 700 and constructing an additional 2 miles of trail north of road 9735 and south of the terminus of road 750 to road 685. The relocated trail on Forest roads 700 and 750 will require additional clearing of brush and trees to create a 20 foot wide trail, 10 feet of each side of centerline of the existing road.

The Project would be featured in Forest Service interpretive programs that take place at the Lava Lands Visitor Center and at other venues throughout Newberry National Volcanic Monument. This Project would provide a good opportunity to present information to the public and Forest visitors regarding the volcanic and geothermal features of Newberry Volcano as well as the area's potential to be a source of clean renewable electrical power. Davenport will coordinate with Forest Service recreation and interpretive specialists throughout the Project.

The No Action alternative will not affect any recreation uses, and any dispersed uses in the general area will continue.

4.8 ROADS

The Proposed Action will require the reconstruction of ½ mile of temporary road and will use existing roads to access the well pads. Vehicles using the roads will include heavy equipment, trucks, specialized vehicles for the set up and transport of drilling rigs and other equipment, service vehicles, road maintenance equipment, and pickup trucks. Traffic may be frequent at times, such as when a number of vehicles are needed to deliver drill rig equipment. The well pad locations were specifically selected so that access would be provided by existing roads, thereby avoiding the need for new construction. Most of the roads will require some maintenance including cutting encroaching brush and vegetation

along the roadsides, and resurfacing and grading segments that are not currently suitable for the transportation of equipment. Some widening for turnouts to improve the radius of curves will be conducted on the existing roads. Two new culverts will be installed and some new cut and fill will be required. All road work will be done in accordance with Forest Service specifications. The intent of the road maintenance is to protect the existing road beds and provide safe access for vehicles associated with the Project and for others who may use the roads. Signs notifying the public of industrial traffic will be posted at appropriate locations, and will meet Manual for Uniform Traffic Control Devices standards. CB radios will be used by project vehicles to alert others of ingress and egress. Similar access roads were evaluated for use and approved in the 1994 Geothermal EIS.

Under the No Action alternative, all existing roads in the area will remain as they are, vegetation will continue to encroach, and their condition will not be improved by the implementation of this project.

4.9 SCENIC RESOURCES

Under the Proposed Action, changes to the existing landscape within the Scenic Views Management Area would be minimal. No well pads will be located within Scenic Views Management Area, and only some improvements to existing roads would take place in this MA. These changes would not create any visible contrasting appearances to the existing landscape character. To both the casual forest visitor in the immediate area and the casual forest visitor at a distance, these changes would not disturb the appearance of the existing landscape character.

The well pads will be located within the General Forest Management Area, and the scenery management objective for this area is Modification. Each 5-acre well pad, with geothermal drilling operations, will be located where forest vegetation previously had been, and the setting will be modified at these sites. The 5-acre opening would contrast somewhat to adjacent and surrounding areas of existing tree and shrub vegetation.

From higher points around the Project and possibly within the Monument, such as from Paulina Peak, the tops of drill rigs may be seen. The drill rigs, which will be on site temporarily while wells are being drilled (approximately 50 days per well), will be up to about 150 feet in height, and could be noticed; however, it would not be a dominant feature in the landscape. The required red blinking light on top of the drill rig for visibility to aircraft may be viewed from Highway 97 or from other areas with views to Newberry.

Nearby, the approved Cal Energy project is fully within the Scenic Views Management Area, and the 1994 Geothermal EIS (Sections 3.6 and 4.6) presented a detailed evaluation of the scenic resources of the much larger Cal Energy project. In comparison to that project, the effects of this proposal on the landscape or to scenic values would be temporary and of shorter duration. It is possible that the casual forest visitor may not notice the proposed changes.

Under the No Action alternative, project activity would be absent so there would be no effects to scenic resources. The past timber harvest activities and existing roads would continue to dominate the landscape character that is typical for this part of the Deschutes National Forest.

4.10 GEOLOGY, SOILS, AND MINERALS

Geothermal systems are typically located in active geologic settings with recent or active volcanism. Although geologic processes can present potential geologic hazards, these impacts require a specific geologic setting. The geologic setting for the Project at Newberry Volcanic is not conducive to geologic hazards, and the proposed exploration work is relatively minimal and not extensive enough to present a risk of inducing any geologic activity.

The risk of landslides and slope instability is low in the project area. Appropriate pad construction and road maintenance practices, including balance cut and fill, and culverts and berms to direct runoff, will be utilized to further minimize soil erosion. Traffic will be restricted to roads and designated areas to further avoid erosion potential.
The Proposed Action will not have any adverse effects on any cinder or rock sources around Newberry Volcano, although established public rock sources may be utilized if needed. The geothermal resource, considered to be a fluid mineral by the BLM, will be targeted by drilling up to nine deep wells and will be tested temporarily if drilling results are successful.

In the No Action alternative, there will no effect on any of the existing soils or geologic features in the area. No mineral resources, including geothermal, would be affected.

4.11 NOISE

Noise is regulated by BLM GRO Order No. 4 for construction and drilling operations, and will be within the noise regulation levels permitted by the State of Oregon (1994 Geothermal EIS 4.7.3.2). Considering the remoteness of the site and the distance from noise sensitive properties, it is unlikely that noise will have any effect on people or their activities. While pad construction and road maintenance will occur only for a short duration, drilling operations, although also temporary, will occur 24 hours a day for up to approximately 50 days per well. This will produce a constant sound that can be heard within the immediate area but below the noise emission levels regulations established for the State of Oregon. Well testing equipment would be properly maintained and muffled to minimize the sounds associated with well testing and keep them within regulatory levels. Any noise will be temporary and of short duration, and not greatly different from other forest management activities, such as timber harvest or road construction which also utilize heavy equipment, except that some drilling activities will occur 24 hours a day. A further description of noise associated with geothermal exploration activities can be found in Section 4.7 of the 1994 Geothermal EIS.

Under the No Action alternative, there would be no additional noise created in the area.

4.12 AIR QUALITY

Air emission levels are expected to be very low and not exceed any applicable air quality standards. Effects on air quality as a result of the Proposed Action are expected to be primarily associated with short-term dust from construction activities and travel over unsurfaced roads, and vehicle exhaust. Emissions would be similar to other construction or timber harvest projects. Watering of roads and pads during construction will be required to reduce blowing dust.

The geothermal resource at Newberry is expected to produce steam and hot water, which would be vented to the atmosphere during the well testing phase. The types of materials vented into the air are unique to the discovered geothermal resource, but are expected to include mostly carbon dioxide, smaller amounts of hydrogen sulfide and trace amounts of methane and ammonia. There may also be trace amounts of elements such as mercury, boron, or arsenic present. During well venting, the plume is very buoyant and would transported and dispersed by wind away from the operation. Of all the pollutants, hydrogen sulfide is of primary concern due to the fact that it can be smelled at very low concentrations. Odor is the primary public concern for hydrogen sulfide as detection by smell (rotten eggs) will usually provide a "warning" at concentrations much below levels of health concern. During unabated well venting, emissions of hydrogen sulfide to the atmosphere would be expected at instantaneous concentrations of 80 to 400 ppm within the steam plume. Although this concentration is high enough to have adverse health effects under direct exposure, the plume is very buoyant and would dissipate quickly to lower concentrations not high enough to pose a health risk. Further discussion on effects to air quality can be found in Section 4.5 of the 1994 Geothermal EIS.

Under the No Action alternative, there would be no change to the existing air quality and not additional dust stirred up into the atmosphere by this project.

4.13 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past actions in the immediate area have included at least two major timber sales, the Fishhook Timber Sale approved in 1994, and the earlier North Peak Salvage Sale. Forest stands in the general vicinity have suffered considerable mortality due to mountain pine beetle infestations. Extensive logging, road construction, and other smaller scale forest management activities have substantially altered the forest vegetation in and around the lease areas.

Also in the same area, but just east of the proposed well pads, is the Cal Energy geothermal project, which was addressed in detail in the 1994 Geothermal EIS. Cal Energy implemented their project in 1994 and drilled several exploration wells from 1994 to 1996. Three well pads are still located on the nearby leases, but there are no wells. ORMAT continues to maintain the project area in accordance with BLM and Forest Service direction and oversight. The project is currently in a suspended status, and ORMAT has not indicated that they will resume operations in the immediate future.

The Lava Cast Project overlaps the area included in the Davenport Geothermal Project and has recently been approved for implementation. The Lava Cast Project encompasses a total of approximately 36,050 acres and involves vegetation treatments of forest stands using non-commercial thinning, prescribed fire, mechanical shrub treatments, and pruning and girdling of trees.

The Proposed Action consists of exploration operations on federal geothermal leases to acquire data about the geothermal resource. If successful, this could lead to additional exploration and potentially the development and production of discovered geothermal resources in the foreseeable future. Any proposals for subsequent exploration or development operations would require further environmental analyses and approvals. Information acquired from the exploratory wells currently proposed would be extremely important to predict the type of project and specific locations for consideration in future environmental analyses. Future development of the geothermal resource that may be found as a result of this proposed action is, at this time, speculative, and not ripe for decision because a proposal for development will rely entirely on the nature of the resource found during exploratory drilling.

Cumulative effects have been considered at an appropriate scale and level of detail for each resource, and are included within Chapters III and IV and within specialist's reports at the Prineville BLM District Office. The Proposed Action is limited in scope, involves temporary activities, and utilizes areas that have been previously disturbed which, when added to past, present, and foreseeable future actions in the vicinity, will not create a potentially significant cumulative effect.

4.14 COMPLIANCE WITH OTHER ACTS

The Proposed Action would be in compliance with:

- The Clean Water Act, as there will be no effects to water resources; all drilling products and fluids will be properly stored and managed.
- The Clean Air Act, as any equipment will be maintained in good working condition and have proper emission controls; any well venting will be temporary and conducted to standards required and monitored by BLM; and watering of roads and pads or other dust abatement procedures would be required during times when there could be blowing dust.

There will be no effects on:

- Farmlands, Floodplains, or Wetlands, as there are none in the area
- Low Income / Minority Populations, as this project will have no effect on communities or the general public, regardless of income or minority status. Some specialized jobs or needed services may be created that could be filled from the local area, but will be limited and temporary due to the size and duration of the action.
- Wildernesses, as there are no wilderness areas in or near the area.
- Wild and Scenic Rivers, while a portion of Paulina Creek is identified as being eligible as a wild and scenic river, it is not designated as wild and scenic. However, neither Paulina Creek nor any of it's features would be affected by this Project.

4.15 HAZARDOUS MATERIALS

At certain times there may be materials associated with the Project that may be considered to be hazardous. These will be transported, handled, utilized, and disposed of properly and according to federal and state requirements for each particular product. This is an industrial operation, and it is typical that needed materials may be designated as "hazardous", which helps promote awareness, safe use, and care.

4.16 FIRE PREVENTION

Fire precaution measures will be in place and in accordance with the Forest Service industrial fire prevention program for operations on the Deschutes National Forest.

4.17 IMPLEMENTATION

Under the Proposed Action, implementation of the Project would be overseen and monitored by the BLM and Forest Service to assure compliance with the NEPA decision and to assure that any effects of implementation are consistent with those described in this EA. BLM and Forest Service would work together to authorize actions. BLM's standard procedures for permitting on-the-ground work using Sundry Notice applications would be adapted for this project which would streamline the implementation process and ensure that sufficient oversight is maintained.

4.18 REQUIRED MITIGATION MEASURES FROM THE 1994 GEOTHERMAL EIS ROD

The Record of Decision for the 1994 Geothermal EIS summarized mitigation measures to be applied during implementation of the Cal Energy geothermal exploration, development, and production project. The measures have been reviewed, and those mitigation measures which are applicable to this geothermal exploration project are listed as follows:

Geology and Soils

- All grading of the sites will result in a balanced cut and fill, with no soil import or export required.
- Cut and fill slopes will be engineered and terraced according to height and compacted and maintained to minimize erosion and provide slope stability.
- Surface disturbance will be minimized by limiting operations to designated areas approved by Forest Service or BLM.
- Project construction will include culverts, berms, and ditches to direct runoff and minimize erosion potential.
- Facilities will be located near or within existing clear-cut areas when practical.
- Upon site abandonment, grades will be contoured and revegetated to their original conditions, where practicable.
- Aggregate or other road materials necessary for maintenance or repair of existing roads or construction sites will be obtained from existing road material pits, with concurrence of the Forest Service.

Water Resources

- All water withdrawal requirements (e.g., water for drilling activities, watering roadways) will be coordinated with and subject to approval by the Oregon Department of Water Resources.
- Temporary above-ground pipelines will be laid along existing roads or other appropriate routes, from the well to the drill site, and between drill sites, to minimize surface disturbance.
- If a sump is filled to capacity during drilling, drilling will be suspended until additional fluids can be properly disposed of.
- Portable sanitary facilities will be used during construction and operations.
- Drilling wastes will be contained in sumps lined with clay.
- Pads will be designed to direct drainage to sumps and to contain any spills on site.
- All tanks containing materials such as diesel fuel, lubricating oils, scaling and corrosive control chemicals, cleansers, solvents, and any other hazardous substances or chemicals will be installed above ground and provided with secondary containment (such as curbs or berms around tanks). The secondary containment will have a capacity equal to 100 to 150 percent of the maximum spill volume.
- All drilling fluids will be formulated from non-toxic components and drilling effluent will be below the EPA end-of-pipe toxicity limit.
- An Emergency Contingency Plan will be established for accidental spills or discharges. It will be submitted to the ODEQ for review and approval.

Geothermal Resources

- Proper well drilling, casing programs, and blowout prevention equipment will be used to minimize the potential for uncontrolled blowouts.

Climate and Air Quality

- Construction site watering, road watering, and dust abatement of facilities will reduce fugitive dust emissions. With the approval of the authorized officer, produced fluids will be used for dust control.
- Well testing (with visible geothermal steam emissions) will occur over the minimum time necessary to gather the required data on geothermal steam and noncondensable gas constituents.

Scenic Resources

- Shielded night lighting will be enforced to reduce potential visual impacts and to prevent light pollution of the night sky. Exterior lights will be an indirect light source designed to create safe working conditions and security of the facilities.

Noise

- Mufflers will be installed on exhaust stacks of all diesel or gas-driven vehicles.
- Noise levels will not exceed 65 DBA at the lease boundary, or ½ mile from the source, whichever is greater (in compliance with GRO Order No. 4).

Land Use

- Project characteristics will be consistent with the Deschutes National Forest Land and Resource Management Plan and Newberry National Volcanic Monument Management Plan.

Recreational Resources

- Interpretive exhibits will be developed as a partnership with the Forest Service to provide information to the local population and visitors to the area about the geothermal resource at Newberry, the geothermal Project, and the management of geothermal resources on the Deschutes National Forest.
- Snowmobile Trail No. 64 will be rerouted as needed to assure continuity of travel.

Traffic and Transportation

- To the extent practicable, well pads will be located along existing logging roads.
- A road maintenance agreement will be made with the Deschutes National Forest.
- Roads will be located on approved slope and land types.
- Temporary roads will be restored to a natural setting according to Forest Service standards once the Project is decommissioned or if individual roads are deemed unnecessary.

Vegetation

- To avoid conflict with scheduled timber harvests, exploration activities will be coordinated through the Forest Service.
- Mixed conifer stands will be avoided wherever possible.

Wildlife

- Drilling fluids will be confined to steel tanks or lined sumps.
- Topsoil will be stockpiled, where practical, for later restoration efforts.
- Sumps will be fenced if necessary to keep wildlife from contacting toxic substances.
- Active raptor nests located during exploration will be protected in compliance with LRMP guidelines.
- Monitoring will be performed during exploration to determine location of active nests, to track nesting success, and to protect nests from disturbance.
- Monitor sumps for wildlife access and deter wildlife if necessary.

Cultural Resources

- Identified cultural resource sites will be avoided for siting well pads, roads, or other surface disturbance. If previously undocumented sites are discovered during construction, activities will be halted until the resources are examined by a professional archaeologist and direction is given on how to proceed.

Human Health and Safety

- Wellhead cellars will be covered and appropriately secured in accordance with state requirements.
- All drilling operations will be conducted in compliance with federal GRO Orders No. 1-5.

- All wells will have hydrogen sulfide detection equipment and alarms to protect drilling personnel.
- Hazardous materials will be handled according to all applicable regulations and requirements to minimize hazards to workers and the environment.
- A hazardous materials plan will be prepared and approved by the agencies and ODEQ.
- Spark arresters will be used on all potential spark-emitting equipment.
- Davenport will provide and maintain fire-fighting equipment at the Project.
- Restricted areas (e.g., hard hat areas) will be identified throughout the Project site.
- Prior to final well pad sump reclamation, the contents of the sumps, including clay liners, will be tested for hazardous materials. If contents are found to be hazardous then the material will be disposed of at an approved landfill.
- Davenport will obtain and required State, County, or local permits.

4.19 ADDITIONAL REQUIRED MITIGATION MEASURES

The following mitigation measures are from the environmental analysis for the Newberry Geothermal Exploration Project, and are required in addition to those described in Section 4.18 to minimize any adverse effects and to enhance project implementation (these can be modified upon approval by the Forest Service and BLM if other measures are more suitable in mitigating resource impacts):

- Roads will be maintained only to the extent needed to provide safe transportation of vehicles and equipment associated with the Project; road maintenance will be done to Forest Service standards.

- Snow plowing during the winter will be coordinated with Forest Service to ensure that it conforms to Forest Service standards and is coordinated with other uses that may be occurring in the area.

- Eight miles of existing snow mobile trail will be relocated for the duration of this project to other existing roads and 2 miles of new trail will be created by brushing a cross country route. Figure 4.1

- Fresh water wells will be properly permitted and regulated by the State of Oregon.

- Access roads that are approved by the Forest Service may be gated, posted and temporarily closed to public travel during well testing procedures, movement of equipment, or for other specific activities to eliminate the risks associated with unauthorized visitors.

- Fire extinguishers and tools will be on site at all times and in each vehicle, and water will be stored and available for fire use at each pad; operations will follow Forest Service industrial fire prevention standards and requirements.

- Communication will be maintained at the project, and emergency services will be contacted in the event of any emergencies.

- The well pads and a 50-foot buffer area around the pads will be kept free of vegetation and debris to provide a suitable defensible space for fire precaution.

- Visitors will be allowed by advance permission only, and will wear hard hats around equipment and active operations.

- Restoration and revegetation will be completed by the applicant, in accordance with BLM and Forest Service direction and specifications at the time restoration is needed.

- Well pad siting will avoid larger trees and minimize disturbance to vegetation as much as possible.

- Any merchantable material removed as a result of this project will be accounted for (species, size/volume) and sold following Forest Service procedures.

- Brush, small trees, and debris will be buried, chipped, removed, or otherwise disposed of according to direction from the BLM and the Deschutes National Forest.

- All live standing trees 8 inches and larger in diameter (as measured at 4 ½ feet above ground on the high side of the tree) shall be yarded to an approved decking area. Any portions of trees which break during felling or yarding, or that currently exist within the clearing area, and that are 5 inches or larger in diameter on the small end, and 8 feet or longer in length, shall also be yarded to a approved landing.

- Trees and portions of trees that are 5 inches or larger in diameter on the small end, and 8 feet or longer in length shall be limbed and piled in decks with pieces placed parallel to each other. Decks shall be compact and free of noncombustible material and shall be located on the flat surface (maximum slope of 4%) of the approved landing.

- The decks shall be located on landings, adjacent to roads. Decks shall not be placed in such a manner as to interfere with vehicle travel on roads or the functioning of drainage structures and ditches.

- Machinery involved in vegetation removal and land clearing activities will be washed prior to entering the National Forest to ensure they are free of dirt, grease, debris, and materials that may harbor noxious weed parts and seeds.

- All gravel and rock brought to the project site will come from certified sources and will be certified as weed free by the Forest Service.

- The applicant will conduct annual weed monitoring visits every June after the Project is initiated to ensure that weeds do not become established within any portion of the project, including roads, well pads, and especially at those areas where rock source material has been placed or stockpiled. If weeds are found, the applicant will hand-pull

and bag them if flowers or seeds are present. Until a Forest Service invasive plant EIS is completed, only hand-pulling is allowed in this area, and will most likely be the most prudent treatment, especially if the weed sites are small.

- The applicant will provide the Forest Service an Annual Weed Monitoring Report that shows compliance with the weed monitoring mitigation, and will include descriptions of where and when they monitored, what weed species, if any, were found, and how sites were treated. Also, as part of the annual report, the applicant will include a map showing locations where rock source material was placed. The annual weed monitoring report will be due no later than September 30, and need not be lengthy or elaborate. It will be sent to the Forest's Geothermal Coordinator and the District Botanist.

- Cultural resources are local and limited in size, thus impacts will be avoided by considering known cultural resource locations during project design and by incorporating monitors where subsurface deposits are expected.

- The applicant will monitor sumps and other project features and activities to ensure wildlife are not adversely affected; any wildlife observations will be documented.

- In order to partially offset future snag replacement removal within flammulated owl habitat, the applicant will create 50 snags within the watershed where the proposed project is located. Snag creation trees to be selected by a Deschutes National Forest biologist within the watersheds affected by the proposed Newberry geothermal project.

- Project activities within ¼-mile of any active raptor nests found during project operations would be evaluated and could be subject to seasonal or other operating restrictions to reduce disturbance to nesting birds.

- In order to avoid changing nest stand characteristics, do not construct well pads or temporary roads within a 25 acre buffer around known goshawk nest sites prior to consulting a biologist from the Bend-Fort Rock District of the Deschutes National Forest.

- In order to avoid disturbance to active raptor nest sites, do not conduct temporary road construction, road maintenance, well pad construction or well drilling operations within ¼ mile of a known active goshawk nests between March 1 and August 31.

- If an active red-tailed hawk nest is found, protect the nest by maintaining the forested character of the nest stand by providing a buffer of at least 300 feet in radius around the nest.

- In order to avoid changing nest stand characteristics, do not construct well pads or temporary roads within a 10 acre buffer around known sharp-shinned hawk nest sites prior to consulting a biologist from the Bend-Fort Rock District of the Deschutes National Forest.

- In order to avoid changing nest stand characteristics, do not construct well pads or re-construct roads within a 15 acre buffer around known Cooper's hawk nest sites prior to consulting a biologist from the Bend-Fort Rock District of the Deschutes National Forest.

- To compensate for the loss of future snag replacement trees and the lack of down woody material in areas where proposed project activity wood occur, leave 5 slash piles (approximately 100 square feet each) for each 5 acre well pad site to provide habitat for course woody material dependant wildlife species.

- During hunting seasons, the applicant will post signs on the road leading to the project to let hunters know that industrial operations are taking place; project employees will consider wearing orange vests while working during these times.

- Subsurface fresh water zones will be encased to ensure protection from geothermal drilling.

- During the winter season, signs may need to be posted at appropriate sites to notify snowmobilers that operations are occurring.

- Snowmobile activities and winter trail use will be managed by the Forest Service and coordinated with the applicant to ensure this activity does not conflict with the Project or create unsafe situations for either party.

- The applicant will coordinate with Forest Service recreation and information specialists throughout the Project, through a designated Forest Service point of contact.

- CB radios will be used by project vehicles to alert others of ingress and egress.

- Vehicular traffic will be restricted to roads and designated areas to minimize erosion.

- Well testing equipment will be properly maintained and muffled to minimize the sounds associated with well testing and to keep noise within regulatory levels.

- When timber harvest and vegetation treatments of the Lava Cast Project are implemented, the Forest Service will coordinate activities to avoid any potential conflicts in road use or any other site specific situations within project areas that may overlap.

- Project implementation will be overseen and monitored by the BLM and Forest Service to assure compliance with the NEPA decision and to assure that any effects of implementation are consistent with those described in this EA.

CHAPTER V. PUBLIC COMMENTS AND RESPONSES TO COMMENTS

Three written responses were received from the public as a result of scoping efforts, and were considered during the EA process. One letter expressed concerns that the Project would take place in the homeland of the Klamath Tribes. A second letter expressed concerns regarding a number of topics, including scenic quality, the Newberry National Volcanic Monument, future actions, adherence to federal laws and policies, the scope and timeframe of the Project, threatened, endangered, and sensitive species, recreational values, habitat, fire, cultural resources, restoration, the adequacy of the NEPA process, and the need for geothermal power. A third letter asked that the EA consider several issues, including cumulative impacts, wildlife, water resources, roads, noxious weeds, forest vegetation, scenic resources, and noise. A Scoping Comment Analysis has been completed in which substantive comments were extracted from each of the letters, considered, and addressed in this EA. The Comment Analysis is on file at the Prineville BLM office.

In addition, Davenport has conducted a number of outreach activities to inform the public of the project. These efforts are summarized below:

Introductory Meetings with Doug Perry President of Davenport:

Chuck Burley	State Representative, State Rep Dist 54
Bev Clarno	Former Deschutes County Commissioner and former Speaker of the House for the State of Oregon
Mike Daly	County Commissioner, Deschutes County
Paul Dewey	Attorney, Central Oregon LandWatch
Dave Kanner	Executive Deschutes County
Roger Lee,	Executive Director, Economic Dev. For Central Oregon
Dennis Luke,	County Commissioner, Deschutes County
Mike Schmidt	Executive Director, Bend Chamber

Key Stakeholder Interviews

Carol MacBeth,	Deschutes County Advocate 1000 Friends of Oregon
Larry Chitwood	Geologist, Deschutes National Forest (Retired)
Stu Garrett	Oregon Native Plant Society
Bill Marlett	Executive Director, Oregon Natural Desert Assoc.
Brooke Snavely,	Communications Director, Sun River Homeowners Assoc.
Patti Gentiluomo	Environmental Director, Sun River Homeowners Assoc.
Tim Lillebo	Executive Director, Oregon Wild
Joanne Mann	Facilitator for Central Oregon Geothermal Working Group
Greg McClarren	Formerly Deschutes Forest Public Affairs
Asante Riverwind	Eastern OR Forest Organizer, Oregon Chapter Sierra Club
Marilyn Miller	Oregon Chapter Sierra Club, Juniper Group

Update Email sent in May 2007 to:

Tammy Baney	Deschutes County Commissioner
Bobbie Brunoe	Warm Springs Tribe
Chuck Burley	State Rep Dist 54
Mike Daly	Deschutes County Commissioner

Paul Dewey	Central Oregon Landwatch
Carel DeWinkel	Oregon Department of Energy
Stu Garrett	Native Plant Society Oregon
Patti Gentiluomo	Sunriver Homeowners Assoc.
Cylvia Hayes	3E Strategies
Anna Johnson	Deschutes County
Dave Kanner	Deschutes County
Roger Lee	Central Oregon Economic Development
Tim Lillebo	Oregon Wild
Dennis Luke	Deschutes County Commissioner
Carol MacBeth	1000 Friends of Oregon
Joanne Mann	Consultant
Jim Mannion	Warm Springs Tribe
Bill Marlett	Oregon Natural Desert Association
Greg McClarren	Consultant
Catherine Morrow	Deschutes County
Mike Schmidt	Bend Chamber of Commerce
Alex Sifford	Sifford Energy Services
Brooke Snavely	Sunriver Homeowners Assoc.
John D. Tuttle	Consultant
Bill Tye	Engineer
Ann Wheeler	Citizen

Other Outreach:

A presentation on the Newberry Project and geothermal energy was made at the November 7, 2006 Geothermal Conference in Bend with approximately 100 in attendance. Informal presentations and discussions have been made at the Pacific Northwest Geothermal Resources Council, the Oregon Institute of Technology, jobs in green energy strategy meeting with local college administrators, the Central Oregon Oil and Rock Society, Professional Engineers of Oregon Conference, and others.

Numerous informal meetings with Al Waibel, consulting geologist for the project, and other members of Davenport team were held with key stakeholders listed above, industry professionals and elected officials staff.

Davenport launched a project website in early 2007 has compiled a list of over 300 potentially interested parties that will be used to conduct future outreach.

Sampling of articles or radio interviews published or aired:

Online	US Dept. of Energy	8/2/06
Article	The Bulletin	8/31/06
Online	RedOrbit	9/1/06
Article	The Source Weekly	10/5/06
Article	Cascade Business News	10/18/06
Article	Cascade Business News	11/1/06
Interview	KBND (with Doug Perry)	

Online	King 5 Seattle	12/22/06
Article	Sisters Nugget	1/30/07
Article	The Bulletin	5/3/07
Article	The Bulletin	5/24/07

CHAPTER VI. CONSULTATION AND COORDINATION

Scoping letters were sent to 157 individuals, organizations, agencies, and central Oregon Tribes in June, 2007 to notify potentially interested parties about the proposed action and to provide an opportunity to submit comments for BLM to consider in the environmental analysis. Three written responses were received and were considered during the EA process.

CHAPTER VII. LIST OF PREPARERS AND REVIEWERS

The following people were consulted with or contributed to the preparation of this EA:

Steve Bigby – Road Manager, Bend-Fort Rock Ranger District
Linda Carlson – Special Uses, Bend-Fort Rock Ranger District
Mollie Chaudet – Deschutes National Forest
Larry Chitwood – Geologist, Deschutes National Forest (Retired)
Linda Christian – Prineville BLM
Rick Collings – Transportation Engineer, Deschutes National Forest
Dennis Davis – BLM Consultant
Carrie Gordon – Geologist, Ochoco National Forest
Katie Grenier – Botany Program Manger, Deschutes National Forest
Robin Gyorgyfalvy – Landscape Architect, Deschutes National Forest
Stephen Horne – Basin and Range Anthropological Consultants
Rod Jorgensen – Soil Scientist, Deschutes National Forest
Margaret Langlas – Environmental Coordinator, BLM State Office
Janine McFarland – Archaeologist, Deschutes National Forest
Terry L Nelson – Wildlife Biologist, BLM
Charmane Powers – Botanist, Deschutes National Forest
Stephen Robertson – Associate District Manager, Prineville BLM
Paul Stern – PLS Environmental, LLC
Steve Storo – Geologist, BLM Prineville
Alice Tye – Environmental Consultant