Water Right Conditions Tracking Slip

Groundwater/Hydrology Section

FILE ## G-13710 & G-13711

ROUTED TO: Mike Mattick

TOWNSHIP/ RANGE-SECTION: 22S/12E - 4
21S/12E - 16,20,21,28,29

CONDITIONS ATTACHED? [X] yes [ ] no

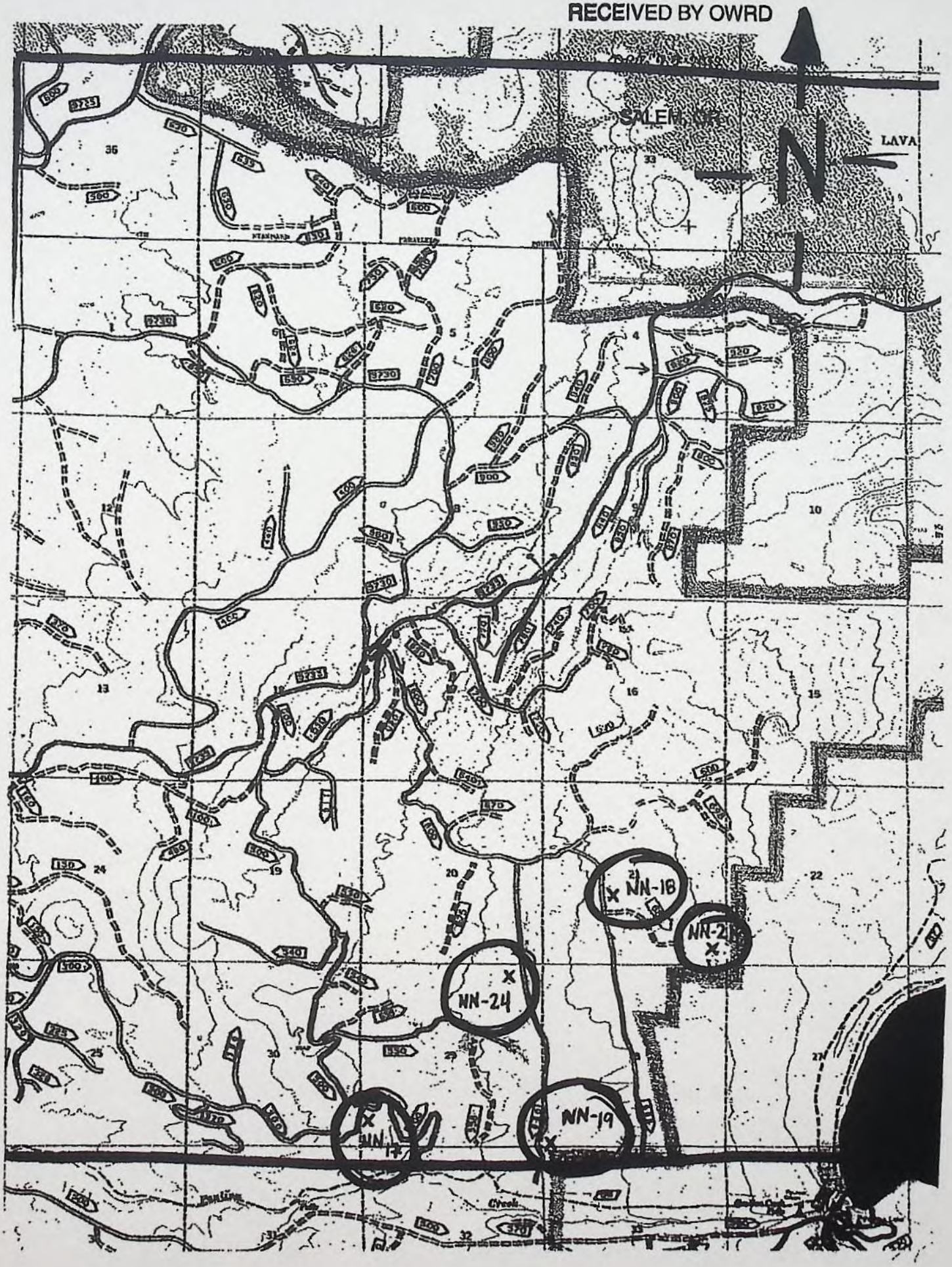
REMARKS OR FURTHER INSTRUCTIONS:

note conditions

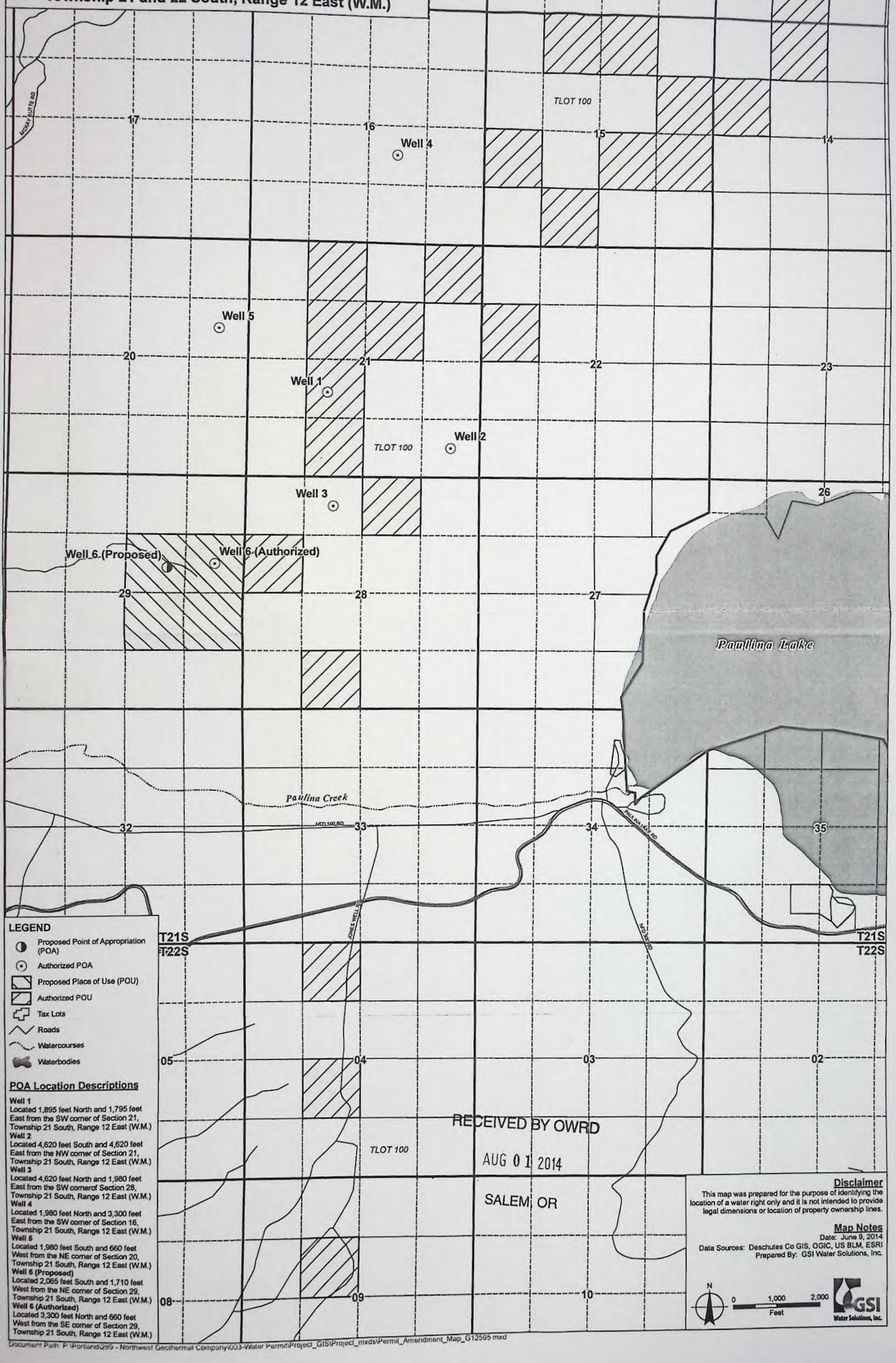
Reviewer: K.Lite

DESC 59592

RECEIVED BY OWRD



Permit Amendment Map
Proposed and Authorized Points of Appropriation
Proposed Additional Place of Use
Permit G-17032
Township 21 and 22 South, Range 12 East (W.M.)



LEGEND

- Proposed Point of Appropriation (POA)
- Authorized POA
- Proposed Place of Use (POU)
- Authorized POU
- Tax Lots
- Roads
- Watercourses
- Waterbodies

POA Location Descriptions

Well 1
Located 1,895 feet North and 1,795 feet East from the SW corner of Section 21, Township 21 South, Range 12 East (W.M.)

Well 2
Located 4,620 feet South and 4,620 feet East from the NW corner of Section 21, Township 21 South, Range 12 East (W.M.)

Well 3
Located 4,620 feet North and 1,980 feet East from the SW cornerof Section 28, Township 21 South, Range 12 East (W.M.)

Well 4
Located 1,980 feet North and 3,300 feet East from the SW corner of Section 16, Township 21 South, Range 12 East (W.M.)

Well 5
Located 1,980 feet South and 660 feet West from the NE corner of Section 20, Township 21 South, Range 12 East (W.M.)

Well 6 (Proposed)
Located 2,065 feet South and 1,710 feet West from the NE corner of Section 29, Township 21 South, Range 12 East (W.M.)

Well 6 (Authorized)
Located 3,300 feet North and 660 feet West from the SE corner of Section 29, Township 21 South, Range 12 East (W.M.)

Disclaimer

This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

Map Notes

Date: June 9, 2014
Data Sources: Deschutes Co GIS, OGIC, US BLM, ESRI
Prepared By: GSI Water Solutions, Inc.

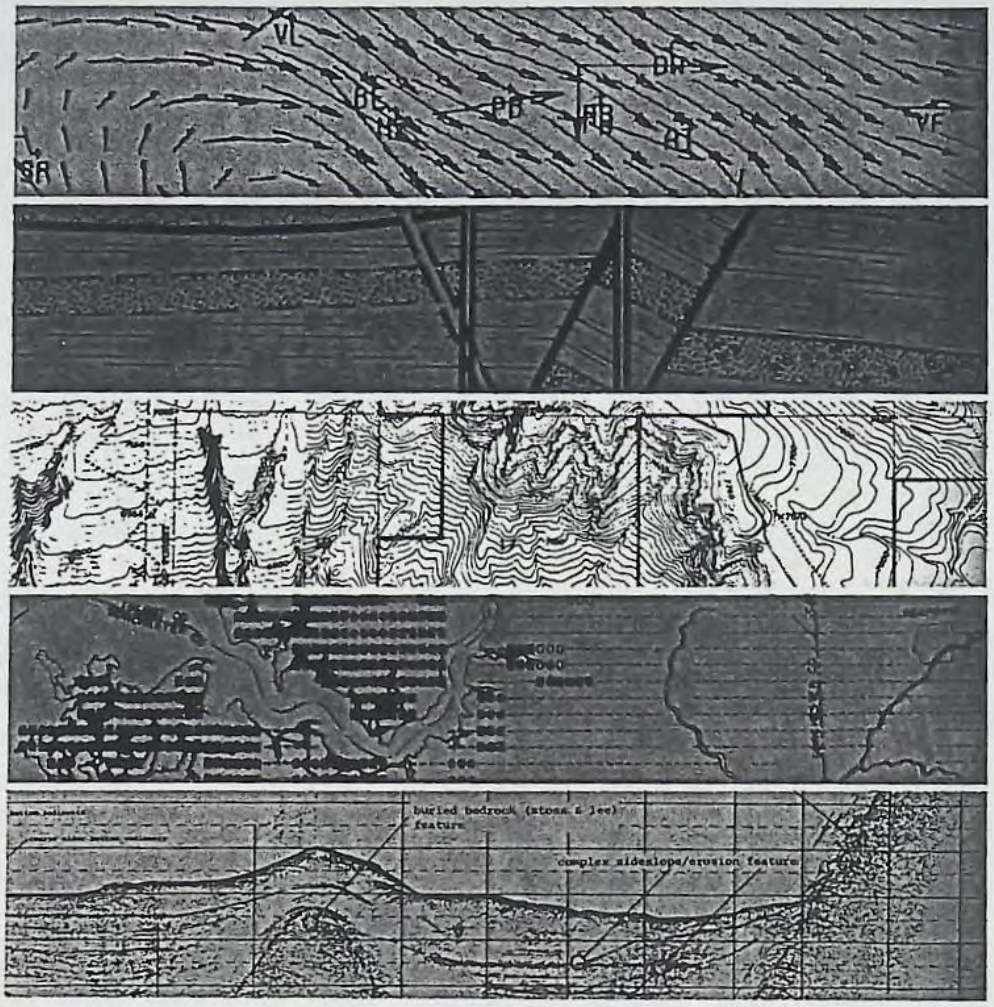
N
0 1,000 2,000
Feet

GSI Water Solutions, Inc.

Document Path: P:\Portland\269 - Northwest Geothermal Company\003-Water Permit\Project_GIS\Project_mxds\Permit_Amendment_Map_G12595.mxd

ATTACHMMENT 4

b-13711



REVISED REPORT
NEWBERRY GEOTHERMAL PROJECT
HYDROLOGY BASELINE STUDY
NEWBERRY VOLCANO, OREGON
FOR
CE EXPLORATION COMPANY

May 4, 1994
23305-002-043

DAMES & MOORE

Attachment 1

U.S. Forest Service
and
Bureau of Land Management

Record of Decision
NEWBERRY GEOTHERMAL PILOT PROJECT

THE DECISIONS

A. U.S. Forest Service Decision

As lead agency as well as the agency responsible for surface management, the decision being made by the U.S. Forest Service is whether or not to approve the proposed geothermal activity and take subsequent action on the following approvals and authorizations for implementation of surface disturbing activities:

- Approval of Plans of Operation for Exploration, Development, Production, Utilization, and Disposal;

- Authorization for, and approval of, specifications for surface disturbance and occupancy.

Based on information analyzed and disclosed in the Final EIS, public comments, the Deschutes National Forest Plan, the Newberry National Volcanic Monument (NNVM) legislation, and associated documents that the Final EIS is tiered to or incorporates, it is my decision to approve the geothermal activity proposed in Alternative B, with the mitigation and monitoring elements described in Attachments A and B of this ROD, and with the following modification:

> Plant site 3 is not to be developed as the power plant location. Only plant sites 1 and 2 are to be considered for final siting of this facility.

It is also my decision to take subsequent actions to authorize implementation. Subsequent approvals are conditioned upon CE Exploration Co. (CEE) adopting and adhering to the mitigation measures and monitoring elements included as part of this decision and summarized in the attachments to this ROD.

With this ROD, I am also approving a non-significant Forest Plan amendment to specifically address the expected visibility of the steam plumes for this facility. The text for the amendment to be added to Standard and Guideline M9-83 of the Forest Plan is, "For steam plumes associated with the Newberry Geothermal Pilot Project and emanating from this management area (M9), "modification" is allowed as a visual quality objective." Attachment C of this ROD provides background information and rationale for this amendment.

B. Bureau of Land Management Decision

As a cooperating agency as well as the agency responsible for management and administration of Federal geothermal leases and subsurface activities, the decision being made by the Bureau of Land Management is whether or not to approve the proposed geothermal activity and take subsequent action on the following approvals and authorizations for implementation of surface disturbing and subsurface activities:

- Approval of Plans of Operation for Exploration, Development, Production, Utilization, and Disposal;

- Approval and issuance of individual Geothermal Drilling Permits and Sundry Notices for the project;

- Approval of a Site License.

Based on information analyzed and disclosed in the Final EIS, public comments, the Deschutes National Forest Plan, the NNVM legislation, and associated documents that the Final EIS is tiered to or incorporates, it is my decision to approve the geothermal activity proposed in Alternative B, with the mitigation and monitoring elements described in Attachments A and B of this ROD, and with the following modification:

> Plant site 3 is not to be developed as the power plant location. Only plant sites 1 and 2 are to be considered for final siting of this facility.

It is also my decision to take subsequent actions to authorize implementation. Subsequent approvals are conditioned upon CEE adopting and adhering to the mitigation measures and monitoring elements described in the Final EIS and summarized in the attachments to this ROD.

C. Decision to be made by Bonneville Power Administration

As a cooperating agency as well as the agency responsible for developing, purchasing, marketing, and transmitting electrical power to customers in the Pacific Northwest, the BPA will decide whether or not to adopt the Final EIS and the decisions made by the U.S. Forest Service and BLM. BPA's decision will be made no sooner than 30 days after the publication of the Notice of Availability in the Federal Register, and will be released to the public in a separate Record of Decision.

ADMINISTRATIVE APPEAL PROCEDURES

A. U.S. Forest Service

APPEAL RIGHTS
The Forest Service decision is subject to appeal pursuant to 36 CFR 215.7. A Notice of Appeal must be filed within 45 days of the date of publication of the legal notice in the Bend Bulletin.

Mail appeals to:

Regional Forester
USDA Forest Service
Pacific Northwest Regional Office
ATTN: 1570 Appeals
P.O. Box 3623
Portland, Oregon 97208-3623

In accordance with 36 CFR 215.14, Content of an Appeal, appellants are responsible for providing the Appeal Deciding Officer with sufficient evidence and rationale to show why the Responsible Official's decision should be changed or reversed.

IMPLEMENTATION DATE
Implementation of the decision will occur no sooner than 50 days following publication of the legal notice in the Bend Bulletin.

FOR FURTHER INFORMATION REGARDING FOREST SERVICE APPEAL PROCEDURES, CONTACT: Susan Skakel, Environmental Coordinator, Deschutes National Forest, 1645 Highway 20 East, Bend, Oregon, 97701. Telephone (503) 383-5563.

B. Bureau of Land Management

The Bureau of Land Management's decision may be appealed to the Interior Board of land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4 and BLM Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the following address) within 45 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

Where to File Notice of Appeal:

U.S. Department of the Interior
Bureau of Land Management
Oregon State Office
P.O. Box 2965
Portland, Oregon 97208

If you wish to file a petition pursuant to regulation 43 CFR 4.21 (58 CFR 4939, January 19, 1993) (request) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with the Oregon State Office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay:

1. The relative harm to the parties if the stay is granted or denied,
2. The likelihood of the appellant's success on the merits,
3. The likelihood of immediate and irreparable harm if the stay is not granted, and
4. Whether the public interest favors granting the stay.

SIGNATURES AND DATE

Sally J. Collins 8/30/94
SALLY COLLINS Date
Forest Supervisor
Deschutes National Forest

James L. Hancock 8/30/94
JAMES L. HANCOCK Date
District Manager
Bureau of Land Management
Prineville District

I. INTRODUCTION

The Final Environmental Impact Statement (EIS) for the Newberry Geothermal Pilot Project documents the environmental analysis for proposed geothermal exploration, development, and operations on the west flank of Newberry Volcano. We have reviewed and considered the Final EIS and related materials, including the Comment Report which summarizes public comments and the agencies' responses to comments on the Draft EIS. We have also considered the direction set forth in applicable land management plans and direction for the project area, as well as the direction described in the 1990 legislation establishing the Newberry National Volcanic Monument. Additionally, we have considered the recommendations of the Northwest Power Planning Council (NWPPC) and their forecasts concerning future power needs for the Pacific Northwest. The decisions reflect consideration of each of these items. This Record of Decision (ROD) documents the decisions and their rationale for the U.S. Forest Service and the Bureau of Land Management (BLM). The Bonneville Power Administration is also a cooperating agency in the environmental analysis, and will prepare a separate ROD.

A. Background

In July 1992, CE Exploration Company (CEE) of Portland Oregon, submitted to the BLM and U.S. Forest Service proposed Plans of Operations for exploration, development, and production of geothermal resources on Federal leases on the west flank of Newberry Volcano, within the Deschutes National Forest. Under these plans, CEE proposes to develop exploration and production wells, construct a transmission line, and build and operate a geothermal power plant capable of generating 33 MW of electric power. This proposal was submitted as part of BPA's Geothermal Pilot Program. BPA would purchase 20 MW of the power and Eugene Water & Electric Board would purchase 10 MW (3 MW would be consumed in operation of the plant and the transmission line).

The intent of this project in terms of the BPA pilot project program, is to demonstrate whether geothermal energy at Newberry Volcano can provide a reliable, economical, environmentally acceptable, and technically feasible alternative source of energy to help meet growing regional power demands. The need for Federal action is to decide whether or not to enable the development of this proposed project (or its alternative) to proceed.

Since the Forest Service, BLM, and BPA each had decisions to be made and responsibilities for authorizing implementation of such a project, it was agreed in a Memorandum of Understanding that the three agencies would cooperate on the environmental analysis and NEPA process. Forest Service was designated as the lead agency for the analysis and preparation of the EIS because the proposed project would occur on National Forest system lands subject to the 1990 Congressional legislation that established the Newberry National Volcanic Monument (NNVM). As such, BLM and BPA were designated as cooperating agencies. Work on the analysis and EIS began in November, 1992. In January, 1994, the Draft EIS was published. The Final EIS documents the environmental analysis and incorporates public comment on the Draft EIS.

B. Scope of the Decision

This Record of Decision applies to the authorities and responsibilities of the U.S. Forest Service and the Bureau of Land Management. The BPA would also need to adopt consenting decisions in order for the project to proceed. Based on the analysis and the Final EIS, the agencies are in agreement on the decision for project approval.

The decisions documented herein provide specific guidelines, mitigation, and monitoring measures that must be adhered to for this project to proceed. No additional environmental analyses are required provided the activity and effects are consistent with effects and assumptions from the analysis, with the documentation in the Final EIS, and with decisions described in the RODs.

C. Public Involvement

A notice of Intent (NOI) to prepare an EIS was published in the Federal Register December 2, 1992. Public and agency scoping meetings were held at five locations in Oregon in February 1993.

Through these scoping meetings and other contacts early in the NEPA process, citizens, government agencies, technical specialists, and public interest groups were asked to help identify issues and concerns. Four informational newsletters were mailed, and public meetings were held to provide information to the public about the proposed project and acquire feedback on what issues to analyze and address in the EIS. These issues helped the agencies formulate alternatives and analyze effects in relation to the issues that were most important to the public and the specialists. All issues raised were addressed in the analysis. Key issues were tracked in detail through the EIS.

A Draft EIS was published and released to the public in January 1994. The Notice of Availability (NOA) was published February 4, 1994 in the Federal Register, initiating the 45-day public comment period. Public and agency meetings were held at three locations in central Oregon during February 1994 to provide information about the proposal, to discuss the analysis, and to accept written comments.

A total of 55 letters or responses were submitted by the public during the comment period. From these, the agencies extracted nearly 600 individual comments. The comments and the agency responses are in the Comment Report, as an attachment to the FEIS.

D. Changes Between Draft and Final EIS

The alternatives remained essentially the same between the Draft and Final EIS documents. No additional issues were raised during the public comment period requiring consideration of a new alternative or major changes in the document. Some additional mitigation and monitoring measures are included in the Final EIS, as suggested by commentors. The public and internal agency reviews revealed factual errors that have been corrected, none of which were significant in terms of requiring revisions of alternatives, effects, or the decisions to be made. The reviews and comments submitted indicated that some discussions, text, and figures needed elaboration and should be more clearly presented. The most significant changes between the Draft and Final documents therefore, are the

clarification of some topics, and greater attention to continuity throughout the document. Most notably, modeling for steam plume depositions was redone and presented in a manner to more accurately and clearly describe the evaluation of effects.

II. ALTERNATIVES CONSIDERED

A. Alternative A

Alternative A is the proposal submitted by CEE, and is based on the Plans of Operation submitted to the BLM and Forest Service in July 1992. It includes exploration, development, production, utilization, and disposal of geothermal resources on CEE's federal geothermal leases on the west flank of Newberry Volcano. Highlights of this alternative, which is described in detail in the Final EIS, include: development of exploration/production well pads at 14 specific locations; construction and operation of one 33-MW power plant at a specific site; construction of associated pipelines and access roads; construction and utilization of an H-frame pole design 115-kv transmission line along the north side of Forest Road 9735 to deliver power from the plant to an existing transmission line; and mitigation and monitoring measures as proposed by CEE. These would be permanent facilities with a contract life of at least 50 years.

B. Alternative B

Alternative B can be described as a modification of Alternative A. The agencies considered issues and concerns raised by the public and by technical specialists. Predicted environmental effects of the proposed action were also considered in developing an alternative that would best respond to the issues and minimize environmental effects. Alternative B is similar to Alternative A in plant design and size, size of the well field and pads, and design of the facilities except for the transmission line. It differs most from Alternative A in respect to location of facilities and mitigation and monitoring measures to be included. Alternative B provides flexibility for the agencies as well as the operator for on-the-ground siting of well pads, power plant, pipelines, and access roads. Alternative B is described in detail in the Final EIS, and highlights include: development of exploration/production well pads at 14 out of 20 possible locations; siting the individual well pads within a 40-acre or less siting area; construction and operation of one 33-MW power plant at one of three possible locations; construction of associated pipelines and access roads; construction and utilization of a single pole design 115-kv transmission line to the south of Forest Road 9735; and additional mitigation and monitoring measures. Facilities in Alternative B would be permanent, with a contract life of at least 50 years.

C. Alternative C

Alternative C is the "no action" alternative, and meets the CEQ's requirement for a no action alternative in an EIS. It provides a baseline for comparison of the other action alternatives. If this alternative were selected, the project as proposed and analyzed would not be allowed to proceed. CEE could however, propose a different project to utilize their leases at Newberry, and a new environmental analysis would need to be done to evaluate that proposal.

Alternative C is also the "Environmentally Preferred Alternative", because there would be no environmental effects from this alternative on the west flank of Newberry Volcano, as there would be no project.

III. REASONS FOR THE DECISION

A. Response to Issues

Based on scoping and public comment, relevant issues were identified and addressed in the Draft and Final EIS. Many issues have been clarified or addressed further in the agencies' responses to comments on the Draft EIS, and are included in the Comment Report. The decision for project approval is based on the consideration of these issues and the effects analysis, as disclosed in the Final EIS. The rationale for selecting Alternative B is summarized below, by major issues that were of most concern or apparent controversy.

1. Geothermal Resources

Newberry Volcano is considered one of the best potential sites in the Northwest for development of geothermal resources for power production. The EIS describes the geothermal character and resources that are believed to exist at Newberry, based on existing data and comparison with other sites. The EIS also discusses possible impacts to hot springs, although it is believed that the deep geothermal system and the shallow hot springs systems are not directly connected. The monitoring program will help detect any changes that may be brought about by geothermal development. It is expected that if any changes do occur, they would likely be slight and long delayed.

There is much information that can be learned from the geothermal exploration and utilization activity which will contribute substantially to our knowledge of the geology and geothermal resources in the Newberry area. This information will also contribute to the scientific understanding of geothermal systems in other parts of the Northwest and could play an important role in our country's efforts to develop alternative and renewable energy sources. Considering the relatively small scale of this project and mitigation and monitoring programs to be implemented, there is an opportunity to utilize the geothermal resource without adversely affecting it or other resources.

2. Power Plant Emissions

A number of concerns were raised about emissions in the steam plume from the power plant, and what effect this would have on air and water quality, particularly in terms of hydrogen sulfide and mercury. State-of-the-art controls for hydrogen sulfide and mercury will be used and are discussed in the EIS, and a number of other mitigation and monitoring requirements will be in place. In fact, these measures are among the most stringent imposed by Federal agencies on a geothermal operation. The analysis shows that the emissions will not endanger the public health or otherwise have any significant adverse impacts on humans, wildlife, vegetation, or water bodies.

During normal operations, hydrogen sulfide is not expected to be detected at any of the key receptor sites identified in the EIS. During upset conditions (a rapid, unscheduled shut down caused by mechanical problems, equipment failure, or transmission line outage), an odor may be detected under certain conditions at the closest receptors for a short period of time. Models used to estimate

effects indicate that mercury accumulations in the lakes in the caldera would be increased by less than 0.00000319 milligrams per liter (or parts per million) over a fifty year duration, and are not likely to be significant. Technical specialists assessed that this is not significant in terms of effects on human health or bioaccumulation. Actual emissions and effects will be closely monitored, to insure that the expected effects are consistent with what is predicted, analyzed, and described in the EIS.

If exploration or production demonstrates that fluid chemistry is significantly different from what is anticipated, and/or the effects are significantly worse than what is addressed in the EIS, then additional measures will be evaluated and required to remedy the situation. If this cannot be done, or cannot be done in a timely manner, the regulatory agencies (including State permitting agencies) retain the authority to stop operations until the situation can be remedied.

From baseline studies conducted to date, it is known that trace amounts of potentially toxic elements, including mercury and arsenic, occur naturally in Paulina and East Lakes in the caldera. These elements, as well as others, are likely derived from the shallow hot springs which feed into the lakes, and are a demonstration of the volcanic and geologic nature of Newberry Volcano. Initial baseline studies indicate that some of these elements, most notably mercury, are also found in tissues of some fish species which inhabit these lakes. What is principally important for the geothermal project is how much the project could add to the naturally occurring levels in the lakes, and what the effects of this could be. The EIS considered and analyzed this and concluded that the amounts that would be contributed by the facility would not be a significant addition over the baseline levels. Again, these will be monitored over the long term to ensure that the effects are within the scope of what is addressed in the EIS. We will continue to work with the appropriate state agencies concerning the collection and interpretation of additional baseline and implementation monitoring data.

3. Visual Resources

Except for the steam plume, project facilities and activities would not be readily visible from most of the twenty key observation points identified in the EIS. These facilities and activities are consistent with Forest Plan Standards and Guidelines for visual quality. Additionally, project facilities will utilize landscaping and natural topography and vegetation as much as possible to help with shielding. The design, color, and lighting of facilities will also help reduce the visibility of the project.

The steam plume would be visible from many of the key observation points, depending in part on distance, elevation of the viewer, time of year, and weather, as the plume size and formation are affected by air temperature and humidity. The Forest Plan was not clear in its description of the plume, so with this Record of Decision, the Forest Plan will be amended with a non-significant Forest Plan amendment (see Attachment C) to make it clear that the plume from this project will meet the Standards and Guidelines set forth for the lease area. Some commentors noted that the fact that the steam plume can be seen should not necessarily considered a detriment. In fact, it can be considered to be a reminder of the volcanic nature of the area, and used as an interpretive feature for Forest visitors to demonstrate the utilization of the

geothermal resources for energy production and show that this is one of the multiple uses of the Forest's resources.

4. Noise

Noise levels associated with the project will be less than standards set by State or Federal regulations, including BLM's Geothermal Resources Operational Orders. Impacts on people are expected to minor, considering that there are no populated areas or recreation facilities in the near vicinity of the project, with the nearest campground approximately 2 miles away from the plant site. At 0.5 miles from the plant site the overall noise level is estimated to be approximately 45 dBA, which is considerably less than the BLM allowable limit of 65 dBA. By design, the power plant facility will be enclosed in a building, which will aid in containing much of the noise produced by the turbine and other equipment. Siting of facilities will use natural topography and vegetation as much as possible to help sound buffering.

5. Unroaded Areas

The unroaded areas identified in the EIS are areas that were previously under consideration for Federal designation as a Roadless Area in the RARE I and RARE II processes. Neither of these reviews found the areas to be suitable for wilderness designation. According to the Oregon Wilderness Act of 1984, these lands are to be managed for multiple use in accordance with the Forest's Land Management Plan. The 1990 Forest Plan for the Deschutes National Forest allocated these areas as General Forest (Management Allocation 8), and Scenic Views (Management Allocation 9). These areas are available for multiple use management in accordance with the Standards and Guidelines for these allocations, and with Forest Plan ROD direction. The activities and facilities are consistent with Forest Plan direction for the area, including those areas that may be presently unroaded. Most of the roadless areas at Newberry are now included in the NNVM, and will be managed as part of the Monument.

While it is recognized that the wilderness potential for these areas are low, the decision is to not allow siting of the power plant at Power Plant Site 3, which lies within an unroaded area. A power plant facility can be considered as having more of an effect than would the well pads, which are much smaller in size and would not require as much equipment, personnel, or ongoing activity. The other two sites described in the EIS are reasonable locations for power plant consideration. By not allowing Plant Site 3 to be used, there would be less of an impact to an area that some people value as having roadless qualities, even though it is not required direction in the Forest Plan. Additionally, mitigation measures including careful placement of well pads, keeping roads and pad sizes to the minimum size or standards necessary, and closing any new roads to public access within unroaded areas will minimize this project's effect on characteristics of this small portion of unroaded area.

6. Relationship with NNVM

The Congressional legislation which designated the Newberry National Volcanic Monument in November, 1990, was the result of hard work and consensus reached by a group of citizens representing a diverse variety of interests. Members of the group knew that Newberry Volcano held great potential for geothermal energy, and many in the group were particularly concerned about what effect development of this resource would have if facilities were to be constructed inside the crater. Through consensus, the group developed a proposal for a National Monument that encourages recreation, natural ecological processes, and the

protection and interpretation of the unique volcanic and geologic features of the area. To help accomplish this, the group decided that no geothermal activities or facilities would be allowed within the Monument. It is important to note, however, that the legislation addresses potential geothermal activity and includes provisions to allow exploration and development to occur outside the NNVM boundaries. These provisions are clearly stated in the Congressional legislation, and are summarized in the EIS.

Perhaps to many people not familiar with Newberry and the recent history leading to its designation as a National Monument, it may seem incongruous to have geothermal activities and facilities near an area presumably set aside for protection of natural, recreational, or aesthetic values. The volcanic nature of Newberry gives the Monument its unique character and qualities. Ironically, it is this same volcanic nature which makes Newberry a high potential for development of geothermal resources. The citizens on the Monument Committee understood this, and crafted provisions for the legislation that would allow geothermal activities outside the Monument's boundaries while also protecting and preserving the natural features and qualities upon which the title of "National Monument" is based.

The geothermal project is indeed within the intent and direction of the Monument legislation. The mitigation and monitoring measures described as part of the project will minimize any adverse consequences that could affect the Monument or the values for which it was created.

7. Siting Flexibility for Implementation

One of the inherent features of the design of Alternative B is that it allows for flexibility based on new information that will be gained through exploration drilling. It gives the operator flexibility in determining which well pad sites to propose next, based on new geologic or exploratory information acquired. By allowing construction at up to 14 of 20 possible well pad sites, one site at a time, the agencies can help assure that the geothermal resources are being tapped in the most efficient and effective manner. Alternative A proposed 14 specific sites for well pads, based on interpretation of existing information of the geology of the area. These 14 are the sites that CEE feels have the greatest potential for hitting the underground geothermal targets. If, during exploration CEE finds they need to adjust their targets, this will allow them to explore in slightly different locations rather than have to use sites that may be less than optimum in terms of reaching the resource. This will also help the agencies ensure that the least amount of sites are disturbed for well pads.

The provision allowing for siting of the individual well pads within a siting area that is up to 40 acres in size will give the agencies the flexibility to insure that surface disturbance is minimized, and that mitigation measures can be most effectively applied. By allowing the agencies to do on-the-ground adjusting prior to approving final placement of the power plant or individual well pads, they can be sure that facilities will be located at sites to minimize the amount of road or pipeline required for instance, or that would avoid specific stands of trees or vegetation and locate facilities in open areas or areas with dead timber stands.

Based on the information from the environmental analysis for the individual resources and the documentation in the EIS, there are no significant differences in overall effects from which 14 of the 20 well pad sites are ultimately

approved for development. The mitigation measures and monitoring program to be required for Alternative B causes the net effect of development of 14 pads to be very similar regardless of which 14 are chosen. The same conclusion can be reached for the selection of either power plant site 1 or 2.

B. Other Decision Factors

The primary underlying goal of this project is to provide an alternative source of energy to help meet the region's growing need for electrical power. This project will be undertaken as part of BPA's Geothermal Pilot Program to demonstrate whether geothermal energy is indeed a feasible and reliable source of power at Newberry. The Forest Service and BLM are contributing to ensure that this can occur in an environmentally safe and efficient manner, while meeting management direction and policy for the Newberry area. The success of this project could influence the future of geothermal energy production in the Northwest and contribute to meeting the power needs of the region.

IV. FINDINGS REQUIRED BY OTHER LAWS AND DOCUMENTS

Consideration has been given to relevant laws, regulations, and direction, including but, not limited to: the Organic Administration Act of 1897; the Weeks Act of 1911; the Multiple use-Sustained Yield Act of 1960; the National Historic Preservation Act of 1966, as amended; the Geothermal Steam Act of 1970 as amended; the Forest and Rangeland Renewable Resource Planning Act of 1974; the Clean Air Act as amended; the Clean Water Act; Protection of Wetlands Executive Order 11990; the Safe Drinking Water Act; the Endangered Species Act; the National Forest Management Act of 1976; the Federal Land Policy and Management Act of 1976; the Archeological Resources Protection Act of 1979; the Native American Religious Freedom Act; the Pacific Northwest Region Record of Decision for Managing Competing and Unwanted Vegetation, 1988; and the Newberry National Volcanic Monument Act, 1990. In addition, consideration has been given to the relevant planning documents such as the Deschutes National Forest Management Plan, and the draft Newberry National Volcanic Monument Plan. Furthermore, full consideration has been given to the effects disclosed in the FEIS and public comment received during the public involvement process. The decisions, with the required mitigation measures, meet all applicable laws, regulations, and policies. The decisions are also consistent with the purposes for which the Deschutes National Forest was established and is being administered. The authorized Plan of Operation is in the public interest.

V. IMPLEMENTATION

A. Schedule

On-the-ground project activity could begin no sooner than 5 days after the close of the 45 day appeal period. Project implementation is also dependent on CEE requesting site specific permission for surface disturbing activities. When the proponent submits Geothermal Drill Permit applications, Sundry Notices, road use permits, etc., the U.S. Forest Service and the BLM will review and process them in a timely manner.

B. Responsibilities and Coordination of the Agencies

The EIS in Chapter 1 covers the general responsibilities of the U.S. Forest Service and the BLM in relation to the geothermal project at Newberry. The details of the coordination between the U.S. Forest Service and the BLM are being addressed under an Interagency Agreement which will be in effect by the time surface disturbing activity takes place under this Record of Decision.

C. Requirements for Project Implementation

The proponent will need to adopt and adhere to the mitigation measures and monitoring elements as summarized in this ROD. The proponent must submit the various plans and agreements called for in the Geothermal Resources Operational Orders and required by the agencies such as a completed Plan of Baseline Data Collection, road use agreement, fire protection agreement, etc. These various items will be submitted at different stages of the project implementation but with most being needed prior to significant surface disturbances.

D. Determination of When Additional Mitigation, Monitoring, or Analysis May be Needed

The U.S. Forest Service and BLM will require the mitigation and monitoring as covered in this Record of Decision. Attachment B discusses the various monitoring programs that have been completed, are ongoing, or that will be instituted during project implementation. If important assumptions or parameters that were used in the EIS to determine projected impacts are found to be incorrect, new parameters will be used to reevaluate and adjust the mitigation measures and/or monitoring programs, as needed. Similarly, if effects are determined to be significantly different that what is predicted in the EIS, additional mitigation and/or further analysis would be required.

Further environmental analysis would be required if any activities are later proposed which do not fall within the scope of what was analyzed in this EIS.

E. Funding

To ensure that future agency funding constraints do not curtail or handicap Federal monitoring/administration of project implementation, the proponent may be requested to enter into a memorandum of understanding and cooperative funding collection agreement to fund a portion of Forest Service administrative costs associated with project implementation. For the same reason, at a future date the proponent may need to enter into similar agreements with the BLM.

ATTACHMENTS

ATTACHMENT A - SUMMARY OF REQUIRED MITIGATION MEASURES

NOTE: Numerous mitigation measures were listed several times under different resource headings in the EIS. In order to make the mitigation measures more understandable, many of them have been combined from within Alternatives A and B and between Alternatives A and B. Therefore, some mitigating measures will not appear under a topic they may have been under in the FEIS.

All practicable means to avoid or minimize environmental harm from the alternative selected have been adopted. Each mitigation measure was considered and selected based on its relevance to the project and ability to be effective. Each mitigation measure can be reasonably and effectively applied to obtain the results for which it is intended. If conditions change, mitigation measures could need to be changed as well.

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.
* If required, additional lay down areas will not be graded, and vegetation will be crushed or cropped and will be rehabilitated upon completion of construction.
* Surface disturbance will be minimized by limiting operations to designated areas approved by the U.S. Forest Service.
* Well testing facilities will be constructed on previously cleared areas (well pad).
* Geotechnical studies will be performed prior to plant construction to ensure site stability; recommendations of the studies will be incorporated into plant and facility design.
* Any sites posing potential geologic hazards will be avoided during facility siting.
* Facilities will be designed to meet or exceed uniform building code design methods for the local seismic zone.
* 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.
* Fluids produced after separation and cooling tower blowdown will be reinjected.
* Upon site abandonment, grades will be contoured and revegetated to their original conditions, where practicable.
* Gravel or other road materials necessary for improvement or repair of existing roads or construction sites will be obtained from existing road material pits, with concurrence of the U.S. Forest Service.
* Exposed areas will be landscaped (including recontouring and revegetating) to stabilize soil and improve aesthetics, as appropriate.

Water Resources

* All water withdrawal requirements (e.g., water for drilling/coring 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 during drilling, additional drilling fluids will be routed to another sump, piped to an injection well, or drilling will be suspended until additional fluid could be properly disposed of.
* The power plant, production well pads, pipelines, transmission line, and roads will be sited to not cross Paulina Creek.
* The power plant design will allow for the produced fluids to provide most of the required operating water.
* Portable sanitary facilities will be used during construction.
* Sanitary facilities for the plant site will include an engineered septic system, including a septic tank and leach field.
* All production and injection wells will be sealed and cased to at least 610 meters (2,000 feet) depth.
* Drilling wastes will be contained in sumps lined with clay.
* Excess geothermal fluids will be contained in lined ponds at the power plan site prior to injection to the geothermal reservoir.
* Pads and facilities will be designed to direct drainage to sumps and t contain any spills on site.
* Stormwater runoff from curbed or bermed equipment areas in the power plant operating area will be collected in storm drains and routed to an oil/water separator. After oil is removed, the stormwater will be routed to the water storage pond at the plant site. The storm drain system will be designed to contain runoff from the 100-year return frequency storm. Storm runoff from other nonoperating areas (such parking lots and equipment storage areas) will be directed to appropriate drainage channels through energy dissipaters.
* The power plant pond will be engineered such that the pond will overflow through an engineered overflow structure to a natural drainage way.
* All tanks containing materials such as diesel fuel, lubricating oils scaling and corrosion control chemicals, cleansers, solvents, and any c hazardous substances or chemicals will be installed above ground and prov with secondary containment (such as curbs or berms around tanks). The secor containment will have a capacity equal to 100 to 150 percent of the max spill volume.
* All drilling fluids will be formulated from non-toxic components drilling effluent will be below the EPA end-of-pipe toxicity limit.
* Geothermal fluids produced during well production and drilling will injected into the geothermal reservoir, evaporated in sumps, or disposed o suitable offsite locations.
* An Emergency Contingency Plan will be established for accidental spill discharges. It will be submitted to the ODEQ for review and approval.
* Withdrawal of shallow groundwater will be down gradient from, and is not expected to interfere with, the groundwater table in the caldera.
* Wastewaters from operations will be evaporated, injected, or otherwise disposed of in a manner approved by the ODEQ.
* No site runoff will drain directly to Paulina Creek.
* CEE will continue to participate in hydrology monitoring.

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* All tanks containing materials such as diesel fuel, lubricating oils, scaling and corrosion 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.
* Geothermal fluids produced during well production and drilling will be injected into the geothermal reservoir, evaporated in sumps, or disposed of at suitable offsite locations.
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* Withdrawal of shallow groundwater will be down gradient from, and is not expected to interfere with, the groundwater table in the caldera.
* Wastewaters from operations will be evaporated, injected, or otherwise disposed of in a manner approved by the ODEQ.
* No site runoff will drain directly to Paulina Creek.
* CEE will continue to participate in hydrology monitoring.

* Storage facilities for fuel and construction equipment, lubrication oils, and the fueling area will be within a curbed or bermed area to contain any spilled material, and paved for permanent facilities.
* The septic system will be designed to have sufficient capacity for public tours and other visitors.

Geothermal Resources

* The project will be designed to allow for return of produced geothermal fluids to the geothermal reservoir to maintain reservoir pressures and fluid production volumes.
* Proper well drilling, casing programs and blowout prevention equipment will be used to minimize the potential for uncontrolled blowouts.
* Brine and excess condensate will be injected into the geothermal reservoir.
* Production wells will be spaced to minimize interference between wells and sustain reservoir production.
* Geothermal reservoir monitoring will be maintained during production to monitor any changes induced by the project.

Climate and Air Quality

* Construction site watering, road watering, dust abatement, surfacing, and paving (if necessary) 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.
* The power plant design will include control of noncondensable gases through the gas treatment system. This treatment system will include a liquid redox system to abate H2S.
* CEE will continue to monitor existing meteorological stations and monitor for H2S at the power plant site and at an appropriate site near Paulina Lake or Paulina Lake Lodge.
* Recirculation of cooling tower waters will be controlled to minimize build-up and emission of chemical constituents.
* Cooling towers will be oriented at the plant site to maximize the dispersion of cooling tower emissions.
* Condensers which provide maximum separation of H2S gas from the steam will be utilized. The use of surface condensers will minimize emissions of chemical constituents from the cooling towers.
* Electronic well field controls will minimize the duration of venting when the power plant was not operating.
* An emissions control plan will be developed for the power plant which will include procedures for breakdown conditions or upset (a rapid, unscheduled shut down caused by mechanical problems or equipment failure, or by transmission line outage).
* In the event of steam venting from upset of plant operations, steam production will be trimmed back to reduce H2S emissions 50 percent within the first hour and 25 percent of full flow after 6 hours. If after the second reduction other air quality problems persist, the wells will be shut back further to prevent further problems.
* Plant operations will be logged to document actual frequency and duration of upset conditions. This information will be used in conjunction with monitoring

of meteorology and H2S concentrations to evaluate the effectiveness of H2S abatement systems.
* Lichen tissue will be monitored and compared to baseline information to test the prediction that air quality impacts to lichen and other vegetation is not anticipated.

Visual Resources

* The cooling towers will be designed to minimize the size and duration of the steam plume.
* Facilities will be painted to blend with surrounding colors.
* Trees will be planted in strategically grouped and selected locations to help break up or screen out visibility of the plant or other facilities.
* During construction of transmission lines and pipelines, land clearing for project facilities or structures will use curvilinear boundaries where practicable instead of straight lines.
* Brush or small trees cleared and not otherwise disposed of will be spread to provide cover habitat for small mammals, reptiles and birds. Woody materials will be randomly placed in areas to conform to adjacent vegetation patterns. All timber and other vegetation material without market value will be mechanically chipped and spread in a manner that will aid seedling establishment and soil stabilization.
* The use of appropriate basic landscape design elements for facility planning and design will be considered.
* Creative landscaping will be applied in visible or sensitive areas to enhance the appearance of project facility installation. Selection of trees and other plants for landscaping will be based on their ability to blend with existing vegetation, utilizing native species where possible.
* Night lighting will be selected and designed to reduce potential visual impacts due to disturbance of the night sky. Exterior lights will be adequate for safe working conditions and security of the facilities.

Noise

* Power plant facilities will be contained inside of a building to reduce noise impacts.
* 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 0.8 km (0.5 miles) from the source, whichever is greater (in compliance with GRO Order No. 4).

Land Use

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

Recreational Resources

* CEE will provide tours of the facilities.
* CEE will provide expansion loops, bridges, or assistance with trail rerouting, to avoid conflicts with snowmobile or Nordic ski use.
* If desired by the agencies, the proponent is willing to build a new Snow Park at a location which will not conflict with operations and maintenance of

the geothermal facilities but will take advantage of vehicle access to this area in the winter time. Additional trails could be developed from this location. Site selection, size, design, maintenance, and management will be determined by the Deschutes National Forest, in cooperation with representatives of local Nordic ski and snowmobile clubs and the operator. The decision on this is not being made here and will require further site-specific analysis.

* Displays or other interpretive avenues will be developed in cooperation with the U.S. Forest Service to provide information to the local population and visitors to the area about the geothermal resource at Newberry, the geothermal project and its facilities, and the management of geothermal on the Deschutes National Forest. These will be available for display at existing facilities (interpretive centers, visitor sites, etc.).
* Snowmobile Trail No. 64 will be rerouted as needed to assure continuity of travel.
* Recreation trails which may be planned in the future will be located to avoid the geothermal facilities.

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 U.S. Forest Service.
* Roads will be located on approved slope and land types.
* Roads will be restored to a natural setting according to U.S. Forest Service standards once the project is decommissioned or if individual roads are deemed unnecessary.

Vegetation

* Gathering and injection system pipeline corridors will be routed through existing cleared areas, where practical. After construction, these corridors will be allowed to revegetate, where practical.
* Disturbed areas will be revegetated with natural or assisted revegetation, including the use of native or local grass, shrub, and tree species.
* Site specific pipeline and access road location will be reviewed by Forest Service botanist to avoid potential sensitive plant habitats described in the Biological Evaluation.

Wildlife

* The transmission line will be designed to avoid hazards for raptors.
* Drilling fluids will be confined to steel tanks or lined sumps.
* Brush and topsoil will be stockpiled, where practical, for later restoration efforts.
* Sumps will be fenced to prevent wildlife from contacting toxic substances.
* Active raptor nests located during exploration and development phases will be protected in compliance with the Forest Plan and Guidelines.
* Monitoring will be performed during exploration and development phases to determine location of active nests, to track nesting success, and to protect nests from disturbance.
* Where possible in the mixed conifer habitat along the transmission line, live trees will not be felled if greater than 51 cm (20 inches) and snags greater than 30.5 cm (12 inches) diameter at breast height.

* Where possible, stumps will be at least 3.6 meters (12 feet) tall to provide foraging habitat for insect-gleaning birds.
* Large trees will be topped instead of felled as a way to keep them from falling onto transmission lines.
* Vegetation will be feathered along the transmission line area, both vertically and horizontally, to avoid long straight edges and the appearance of a cleared swath. The area will be revegetated with grasses and acceptable shrubs which will not impose a safety hazard to line maintenance, but will provide forage for wildlife.
* Larger size, downed woody material will be left in the transmission line area for wildlife use.
* Water sources will be provided for wildlife at locations away from the power plant and well pads to help deter the animals from being attracted to the facilities.

Cultural Resources

* Identified cultural resource sites will be avoided for siting well pads, power plant, roads, pipelines, 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.
* Monitoring of transmission line construction near significant sites will be required to ensure that the sites are avoided.

Human Health and Safety

* Removable winter enclosures will be provided to protect certain equipment and to provide clear access.
* Heat tracing equipment will be provided on piping that has the potential to freeze.
* Upon completion of temperature gradient holes, the wellhead gate valves will be chained and locked to prevent unauthorized access.
* Wellhead cellars will be covered with heavy-duty timber and nailed shut.
* All drilling operations will be conducted in compliance with the Federal GRO Orders Nos. 1-5.
* All wells will have H2S detection equipment and alarms to protect drilling personnel.
* All chemical injection systems installed at the well pads will be placed in a concrete or asphalt bermed area to contain potential spills.
* 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.
* The power plant buildings will be constructed of nonflammable or flame retardant material.
* The Plans of Utilization will incorporate the general fire protection and suppression of the U.S. Forest Service Region 6.
* Spark arresters will be used on all potential spark-emitting equipment.
* CEE will provide and maintain fire-fighting equipment at the project facility.
* A 15-meter (50-foot) fire break will be cleared around the plant site perimeter (fence).

* Restricted areas (e.g., hard hat areas) will be identified throughout the project site.
* The power plant facility will have an emergency shut-in program in the distributed control system which will allow the operator to shut-in a single well or all wells simultaneously in an emergency situation.
* An emergency diesel generator will be provided to supply emergency power when the unit is shut down.
* The plant perimeter will be bermed and secured with a chain link fence to prevent unauthorized access.
* The main access road and local spur roads to the production well pads will be plowed in the winter to remove snow.
* Prior to final well pad sump reclamation, the contents of the sumps, including the 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.
* CEE will obtain any required State, County or local permits.

Additional Mitigation Measures

* RESERVOIR COMPOSITION:
If initial geothermal reservoir test results (including reservoir chemical composition such as mercury, H2S, arsenic, etc.) show that emissions of any pollutant could much higher than expected, then the agencies will require new air quality impact modeling using actual well data. If the new impact modeling shows the possibility of significantly increased impacts the agencies will require additional mitigation. Mitigation could take many forms but might include requiring that well production be reduced, limiting the number of wells allowed to vent at one time, require additional emission controls such as chemical additives, or other reasonable measures.

* GROUNDWATER MONITORING:
Monitoring of groundwater in the project area will help to verify the effectiveness of the casing program. A monitoring well(s) will be installed with the bottom of the well in the regional aquifer at about 1,280 meters (4,200 feet) elevation above sea level or about 500 meters (1,600 feet) below surface. This monitoring well will provide information on the depth of local and regional groundwater, allow baseline groundwater quality sampling before development, and provide a monitoring point during geothermal utilization. Natural variations are expected in groundwater chemistry and therefore installation, sampling and testing to establish baseline conditions is appropriate. The precise location(s) and numbers of groundwater monitoring wells will be determined after the initial exploration wells are drilled and the approximate location of the producing area is determined.

* ARCHAEOLOGY:
In order to reduce the potential for nearby significant sites to be impacted by unauthorized collection by personnel associated with the proposed project, a crew education briefing program be instituted. During each phase of the proposed project (exploration, development, utilization and decommissioning), crews associated with these phases will be briefed by an agency archaeologist, or designated representative, regarding the nature of nearby cultural resources and the legal requirements precluding collection/disturbance at these sites. Secondarily, crews will be briefed on agency notification procedures should

previously undiscovered resources be exposed during surface disturbing activities.

Monitoring will be required of construction of the transmission line near significant cultural sites.

* NOISE:
Careful selection of valve, valve insulation, and "lagging" (thermal and/or acoustical insulation wrapping) of the pipelines shall be used in order to reduce noise. CEE's preliminary plans suggest that many of these noise reduction techniques may be implemented. The U.S. Forest Service will maintain a log of any noise complaints about the facility. Any complaints will be reviewed to ascertain whether the probable noise sources are temporary (sudden, isolated events) or permanent (pipelines or the power plant) and actually related to the geothermal operation. If the noise source should appear to be permanent, and complaints are frequent, studies will be required of the operator to identify the specific noise source, and the agencies will determine if further noise control will be required.

* ODOR:
An odor complaint program will be implemented by the U.S. Forest Service to log any complaints by visitors or people in the area. Complaints will be evaluated, and if significant and related to the geothermal operations, additional mitigation would be required.

* UNROADED AREA:
Any new roads leading into the unroaded area will be closed to the public. Closed roads will be signed and may be gated.

If a temperature gradient well is drilled in the unroaded area before a deep well, the road shall be constructed to the minimum standard necessary to safely access the site. The road may be designed for future upgrade.

* VEGETATION:
To avoid conflict with scheduled timber harvests, scheduling of project exploration and development activities will be coordinated through the U.S. Forest Service with the schedules of the Fishhook LP Salvage and Prairie Dog Sales.

In order to reduce impacts to timber resource, if it is possible facility siting will be directed toward dead timber stands.

Mixed conifer stands will be avoided wherever possible.

* RECREATION:
Provide interpretive information about the geothermal project and safety information relative to winter use near project facilities at 6-Mile and 10-Mile Snowparks and at any new Snowparks that are constructed in the area.

* DECOMMISSIONING
At decommissioning, retain sump ponds in suitable places where the topography will allow for natural accumulation of water.

* WILDLIFE

Monitor unnetted sumps for wildlife access and deter wildlife during periods when hot water is held in sumps before the injection process. Netting may be required.

ATTACHMENT B - SUMMARY OF REQUIRED MONITORING

SUMMARY OF BASELINE DATA COLLECTION

Introduction:

This is a summary of Baseline Data Collection and includes ongoing monitoring as well as future monitoring requirements. This summary has been compiled in order to have in one document a discussion of which inventories or studies have already been completed, which are still ongoing, and which are yet to be completed. In addition to those baseline studies, this document summarizes what is presently proposed to be the ongoing monitoring program if there is geothermal resources production. It is intended that this list and brief summary will assist everyone interested in the geothermal project to understand the scope and magnitude of the monitoring effort involved.

A completed final baseline monitoring plan is required one year prior to power production.

A key concept to remember is that throughout all the geothermal laws, regulations, orders and permits is the legal authority of the federal regulating agencies to revoke, alter, change or suspend any issued permit. The agencies can require an operator to avoid or mitigate an adverse environmental impact.

It is important to understand that any of the required monitoring listed below can and probably will be changed in the future when more information is gained about the geothermal resource and about the environment of the area. This could be new monitoring requirements, increased monitoring, decreased monitoring or discontinuing monitoring for a certain item.

Air Quality - Meteorological

Existing air quality baseline data consist of a combination of project site specific data and regional data which has been used to characterize the project site background conditions. Information has and is being collected by the Forest Service, U.S. Geological Survey and by CE Exploration.

Forest Service - Meteorological data are collected by the Forest Service at five sites relatively close to Newberry Volcano: Lava Butte (north-northwest of the project area), Camp 2 (north-northeast of the project area along China Hat Road), Cabin Lake (south-southwest of the project area), Pringle Falls (west of the project area), and Round Mountain (west-northwest of the project area). The data from the Remote Automated Weather Stations (RAWS) include wind speed, wind direction, temperature, humidity and precipitation. The data record is one to four years long for each of these stations and the data is archived at the BLM in Boise, Idaho and at the Western Regional Climate Center in Reno, Nevada.

U.S. Geological Survey (USGS) - A USGS weather station is located on the south shore of Paulina Lake. The station measures hourly precipitation, temperature and wind speed as part of a hydrology study. Snow depth is also measured every two to three weeks when the data tapes are changed.

CE Exploration (CEE) - CEE is in the second year of monitoring meteorological conditions in the project area. The monitoring is being conducted in accordance with the U.S. Environmental Protection Agency Prevention

of Significant Deterioration guidelines. The data being gathered includes: a) hourly average wind speed and direction, b) hourly surface temperature at standard height for climatological comparisons and plume rise calculations, c) hourly precipitation amounts, d) hourly average relative humidity, and e) biweekly snow depth measurements in the winter.

All three of these monitoring efforts are to be continued. The U.S. Forest Service will most likely maintain their RAWS stations, the CEE monitoring at the proposed geothermal plant site and monitoring at the current U.S.G.S. weather station will be continued. The U.S.G.S. and CEE sites will be monitored until the agencies determine that the climatological conditions are adequately known. Additional or different meteorological station(s) could be required to better define meteorological data.

Schedule: Immediate, continuing while needed.

Air Quality - Pollutants and Visibility

Background concentrations of existing pollutants have not been collected in the immediate vicinity of the project area. The principal existing sources of air pollution near the site are wind-blown or road dust and infrequent slash burning or forest fires. Estimates of mean background concentrations of federal criteria pollutants and relevant hazardous air pollutants as defined by Title III of the Clean Air Act Amendments of 1990 as well as other miscellaneous pollutants which are associated with the geothermal industry were done by Science Applications International Corporation as part of the EIS and it is proposed to be used as the mean background concentrations for baseline monitoring.

Based on the assumed geothermal reservoir chemistry the following reports were prepared for the EIS for air quality baseline information: a) Hydrogen Sulfide Impacts Due to the Proposed Geothermal Development, b) Prediction of Cooling Tower Plume Dimensions, c) The Evaluation of Impacts from Pollutants Other than Hydrogen Sulfide, d) Depositional Impact Analysis within Newberry Crater and from Cooling Tower Plume Drift, e) Visibility Impact in the Nearest Class 1 Area.

Monitoring for Hydrogen Sulfide will be required at the power plant site and at an appropriate site near Paulina Lake or Paulina Lake Lodge. Power plant operations will be monitored for actual frequency and duration of upset conditions.

Schedule: Hydrogen Sulfide monitoring will begin prior to long term well flow testing and continue while needed; Power plant monitoring begin with power plant startup.

Water Quality and Hydrology -

Two studies have been performed to characterize the hydrology in the vicinity of Newberry Volcano. The first study is being conducted by the USGS and was started in 1991 when they started collecting hydrologic, water-quality, and meteorologic data at approximately 21 sites. This study has been limited to data collection, which is ongoing. Over 50 water quality parameters are were measured and include water temperature, Ph, specific conductance, dissolved oxygen, common anions and cations, nutrients, trace elements, radio-chemicals, and isotopes. An interpretation report is scheduled for completion in 1995.

A second study was done by Dames & Moore in 1993 and included collecting and interpreting available hydrogeologic data (including the USGS data) for the Newberry area, but generated no new data. The Hydrology Baseline Report included: a) a compilation of existing data, b) collation of pertinent publicly available data interpretations, c) results of field review and ground truthing of existing data, d) identification of key environmental issues, e) table and maps of reviewed geological and hydrological information, and f) data analysis and interpretation.

The hydrology study currently being done by the USGS will be continued with the same or similar parameters being studied. This study will likely be changed once an evaluation is made of the current information and after geothermal well tests are made.

Schedule: Continuing.

Groundwater monitoring will be required to provide information on the depth of local and regional groundwater, allow baseline groundwater quality sampling before development and provide a monitoring point(s) during geothermal utilization. This program will require one or more monitoring wells to be drilled down hydrologic gradient from the production and injection wells.

Schedule: Wells in place prior to power plant and well-field production startup.

Noise -

Two noise surveys have been performed to establish baseline data at commonly accepted sensitive receptor sites in Newberry Crater and on Paulina Peak.

Noise measurements were performed between 1:00 a.m. and 2:30 p.m. on July 25, 1993, by Consultants in Engineering Acoustic, San Francisco, CA. Measurements periods varied from 15 to 30 minutes at each site. The study area for this analysis included Paulina and North Cove campgrounds and the top of Paulina Peak.

Sound level measurements were made by Science Applications International Corporation at four locations from February through August 1993. The locations were 1) 20 feet north of the Paulina Lake Lodge bridge, 2) at the gate on the snowmobile trail, 300 feet form location 1, 3) midway between bridge and meteorological tower, and 4) at the meteorological tower.

Noise monitoring will be required if noise sources appear to be permanent and complaints are frequent.

Schedule: If needed.

Seismicity -

No special seismic surveys were done for this project. Based on the seismic record of the area and the general geology as now interpreted, no special seismic monitoring for baseline is proposed.

No seismic monitoring is proposed at this time. If felt seismic activity increases then monitoring may be required.

Schedule: If needed.

Subsidence -

No special surveys concerning subsidence have been done for this portion of the project. Minimum subsidence is expected based on the current knowledge of the geology of the area.

Prior to production a subsidence monitoring program will be installed.

Schedule: Prior to well-field production startup.

Aquatic -

Most adverse effects of geothermal development will likely be detectable first through changes in water quality rather than through direct loss or readily detectable changes in aquatic plants or animals. Therefore the aquatic monitoring effort will concentrate on water quality parameters rather then aquatic biological parameters. The possibility does exist that adverse project effects may be subtle and cumulative in nature and therefore preliminary sampling of fish from Paulina and East Lakes for trace metals was instituted after the publication of the Draft EIS.

This study will continue to establish a baseline of trace metal concentration in the fish populations in the lakes.

Schedule: Continuing.

Vegetation -

Vegetative mapping has been done on most of the area for several different projects including the Deschutes National Forest Plan and the Fish Hook Timber Sale Environmental Assessment. For this proposed project vegetation inventory data were obtained by High Desert Ecology (Linstedt, 1993) and cover mapping and characterization was provided by Wildlife Dynamics (Smith, 1993).

A total of six sensitive plant species were identified as possibly being present in the study area, based on habitat availability. These species were identified after consulting information from the U.S. Fish and Wildlife Service, the Oregon Natural Heritage Program and the U.S. Forest Service. Surveys for sensitive plant species were performed for the proposed project in June and July 1993 (Linstedt, 1993) and none were identified in the project area.

Lichen tissue will be monitored and compared to baseline information to test the prediction that air quality impacts to lichen and other vegetation is not anticipated.

Schedule: Continuing

Wildlife -

Management Indicator Species (MIS) are used as a management tool to ensure a diversity of habitat types, species, and populations throughout the forest. In the proposed project area of the Deschutes National Forest, MIS include bald eagle, large raptors (including goshawk, Cooper's, and sharp-shinned hawk),

great gray owl, woodpeckers as cavity nester, peregrine falcon, wolverine, elk, mule deer, American marten, and Pacific western big-eared bat.

Wildlife Dynamics, Inc. prepared a Wildlife Resources Report in September 1993 for the pilot project. Baseline data collection included:

* reconnaissance winter wildlife surveys,
* determining reproductive habitat suitability for northern goshawk, three-toed woodpecker, flammulated owl, American marten and Pacific western big-eared bat
* determining roosting and resting habitat for the Pacific western big-eared bat
* conducting nest surveys for northern goshawk, flammulated owl, great gray owl, and osprey
* conducting baseline surveys of herpetofauna with the impact area, the crater, and along Paulina Creek
* documenting all wildlife observations while conducting the other field work.

Monitoring will be performed during exploration and development phases to determine location of any active nests, to track nesting success, and to protect nests from disturbance.

Schedule: continuing.

ATTACHMENT C - NON-SIGNIFICANT AMENDMENT TO THE FOREST PLAN

An examination of the Forest Plan, simulated views of the proposed project and visual quality analysis of the drill pads, power plant, pipelines, electrical transmission lines, transportation routes and steam plumes disclosed an inconsistency between visual quality objectives in the Forest Plan and proposed activities. The Forest Plan Standards and Guidelines regarding visual quality objectives and geothermal activities focused entirely on the visual effects of the associated surface structures and roads. The steam plume was not clearly and concisely addressed, although it was briefly mentioned in the Forest Plan EIS. Because of this ommission, it may be considered that the steam plume may not meet the visual quality objective as stated in Standard and Guideline M9-83, as it will be visible from a few locations and may draw some visual attention. The visual quality objective of partial retention could not always be met, given the nature of steam plumes. If this standard and guideline had to be applied, it will be in conflict with lease rights, Forest Plan goals, and the intent of the Monument legislation. The Forest Interdisciplinary Team has recommended that standard M9-83 be changed by a nonsignificant Forest Plan amendment to allow steam plumes to exceed the partial retention standard.

This decision is based in part on the Forest Plan's Desired Future Condition which states that geothermal leases and permits have been issued in a timely way. This action also meets the Forest goal to provide for exploration, development, and production of energy resources on the Forest while maintaining compatibility with other resource values.

The Forest Plan recognized that there may need to be exceptions to the visual standards because many of the visible areas are linear in shape and must be occasionally crossed. The geothermal project facilities located on the ground will continue to meet the visual quality objective of partial retention and only the visual quality objective of the steam plume has been affected.

This change is determined to be a non-significant amendment to the Forest Plan for the following reasons:

1. The amendment is site specific and the effects are local to the project area. The amendment applies to the steam plumes within the geothermal pilot project area only, not to surface facilities or developments. It does not result in any changes to projected goods or services or other outputs of the Forest Plan.

2. The amendment results in neither an increase or decrease in acreage of types of VQO's, General Forest Management Areas or Scenic View Management Areas since the amendment applies only to the steam plume within the geothermal pilot project area. Any associated geothermal facilities will continue to be planned to meet and mitigate visual quality objectives as mentioned in the Forest Plan. This recommendation is based on the existing management areas that surround the acquired lands along with the resource values, including visual sensitivity.

3. The changes will not adversely affect the overall goals and outputs of the Forest Plan. The amendment supports the previously stated Forest goal and improves consistency of the Forest Plan with the Geothermal Steam Act and the Monument Legislation. The amendment facilitates implementation of the project and the resulting benefits of the contribution of this alternative power source to offsetting electrical power demands and the reduction of adverse effects associated with other energy sources presently used in the Pacific Northwest.

In view of the above, and in order to allow proceeding with the geothermal project, this non-significant site specific amendment is made to the Forest Plan.

Application No. G1371
Permit No.

APPENDIX I

LEGAL DESCRIPTION OF AREA
INVOLVED IN HJR 31
(OAR 345-40-015)

LISTING OF PARTS OF SECTIONS

T. 21 S., R. 12 E.

Lot 4, S 1/2 NW 1/4 NW 1/4, SW 1/4 NW 1/4, W 1/2 SE 1/4 NW 1/4, SW 1/4, S 1/2 NW 1/4 SE 1/4, Section 1	370.72 Ac.
SE 1/4 NE 1/4, W 1/2 SE 1/4, W 1/2 SW 1/4 SE 1/4, SW 1/4 SW 1/2 SE 1/4, Section 3	150.00 Ac.
NE 1/4, W 1/2 NE 1/4 NW 1/4, SE 1/4 NW 1/4, SE 1/4 SW 1/4 NW 1/4, SE 1/4, NE 1/4 NW 1/4 SW 1/4, S 1/2 NW 1/4 SW 1/4, NE 1/4 SW 1/4, S 1/2 SW 1/4, Section 10	540.00 Ac.
W 1/2 SE 1/4 SE 1/4, Section 9	20.00 Ac.
S 1/2 SW 1/4, S 1/2 SE 1/4, Section 11	160.00 Ac.
NE 1/4 NE 1/4, SE 1/4 NW 1/4 NE 1/4, E 1/2 SW 1/4 NE 1/4, SW 1/4 SW 1/4 NW 1/4, SE 1/4 NE 1/4, SE 1/4, E 1/2 SE 1/4 SW 1/4, Section 16	300.00 Ac.
E 1/2, E 1/2 SE 1/4 SW 1/4, Section 21	340.00 Ac.
NE 1/4 NW 1/4, E 1/2 SW 1/4 NW 1/4, SE 1/4 NW 1/4, SW 1/4, E 1/2, Section 28	580.00 Ac.
N 1/2 N 1/2, Section 33	160.00 Ac.
N 1/2, SE 1/4, SE 1/4 NE 1/4 SW 1/4, SE 1/4 SW 1/4, SE 1/4 SW 1/4 SW 1/4, Section 34	540.00 Ac.

T. 22 S., R. 12 E.

N 1/2 NW 1/4, E 1/2 SW 1/4 NW 1/4, SE 1/4 NW 1/4, E 1/2, E 1/2 NW 1/4 SW 1/4, NE 1/4 SW 1/4, SE 1/4 SW 1/4, Section 2	520.00 Ac.
W 1/2, N 1/2 NE 1/4, SW 1/4 NE 1/4, SE 1/4, Section 3	600.00 Ac.
E 1/2 NE 1/4, E 1/2 SE 1/4, Section 4	160.00 Ac.
NE 1/4 NE 1/4, E 1/2 SW 1/4 NE 1/4, SW 1/4 SW 1/4 NE 1/4, SE 1/4 NE 1/4, SE 1/4, NE 1/4 NE 1/4 SW 1/4, S 1/2 NE 1/4 SW 1/4, SE 1/4 SW 1/4, Section 9	320.00 Ac.

T. 22 S., R. 12 E. (Continued)

N 1/2, N 1/2 SW 1/4 SW 1/4, N 1/2 SW 1/4 SW 1/4, N 1/2 SE 1/4 SW 1/4, N 1/2 SE 1/4, N 1/2 SW 1/4 SE 1/4, N 1/2 SE 1/4 SE 1/4, Section 10	560.00 Ac.
N 1/2 NW 1/4 NW 1/4, N 1/2 NE 1/4 NW 1/4, N 1/2 NE 1/4, SE 1/4 NE 1/4, S 1/2, Section 11	480.00 Ac.
N 1/2, N 1/2 SW 1/4, E 1/2 SW 1/4 SW 1/4, SE 1/4 SW 1/4, SE 1/4, Section 13	620.00 Ac.
NE 1/4 NW 1/4 NW 1/4, NE 1/4 NW 1/4, N 1/2 NE 1/4, N 1/2 SW 1/4 NE 1/4, SE 1/4 NE 1/4, Section 14	190.00 Ac.
NE 1/4 NE 1/4 NE 1/4, NW 1/4 NE 1/4, N 1/2 NE 1/4 NE 1/4, SW 1/4 NE 1/4 NE 1/4, Section 16	80.00 Ac.
N 1/2 NE 1/4 NW 1/4, SE 1/4 NE 1/4 NW 1/4, N 1/2 NE 1/4, SW 1/4 NE 1/4, NW 1/4 SE 1/4 NE 1/4, Section 24	160.00 Ac.

T. 22 S., R. 13 E.

N 1/2 NW 1/4, SW 1/4 NW 1/4, N 1/2 SE 1/4 NW 1/4, SW 1/4 SE 1/4 NW 1/4, W 1/2 NW 1/4 NE 1/4, NW 1/4 SW 1/4, NW 1/4 NE 1/4 SW 1/4, NW 1/4 SW 1/4 SW 1/4, Section 2	230.00 Ac.
N 1/2, NW 1/4 SW 1/4, N 1/2 NE 1/4 SW 1/4, NW 1/4 SW 1/4 SW 1/4, N 1/2 SE 1/4, Section 3	470.00 Ac.
N 1/2 NW 1/4 NW 1/4, N 1/2 NE 1/4 NW 1/4, SW 1/4 NW 1/4 NW 1/4, N 1/2 NE 1/4, N 1/2 SE 1/4 NE 1/4, SE 1/4 SE 1/4 NE 1/4, Section 4	160.00 Ac.
N 1/2, SW 1/4, N 1/2 SE 1/4, SW 1/4 SE 1/4, N 1/2 SE 1/4 SE 1/4, SW 1/4 SE 1/4 SE 1/4, Section 5	630.00 Ac.
W 1/2, W 1/2 NE 1/4, W 1/2 SE 1/4, Section 8	480.00 Ac.
NW 1/4, NW 1/4 NE 1/4, SW 1/4 NE 1/4 NE 1/4, SW 1/4 NE 1/4, NW 1/4 SE 1/4 NE 1/4, N 1/2 SW 1/4, N 1/2 SW 1/4 SW 1/4, N 1/2 SE 1/4 SW 1/4, W 1/2 NW 1/4 SE 1/4, Section 17	400.00 Ac.
N 1/2, SW 1/4, N 1/2 SE 1/4, N 1/2 SW 1/4 SE 1/4, SW 1/4 SW 1/4 SE 1/4, N 1/2 SE 1/4 SE 1/4, Section 18	610.00 Ac.
N 1/2 NW 1/4, Section 19	80.00 Ac.

T. 21 S., R. 13 E.

NW 1/4 NW 1/4 SW 1/4, S 1/2 NW 1/4 SW 1/4, SW 1/4 SW 1/4, W 1/2 SE 1/4 SW 1/4, Section 4	90.00 Ac.

DIVISION 40

DESIGNATION OF AREAS OF OREGON AS "SUITABLE" OR "UNSUITABLE" FOR THERMAL POWER PLANT SITING

Purpose

345-40-005 The purpose of these rules is to designate broad geographical areas of the state as to their suitability or unsuitability for the siting of thermal power plants.

Stat. Auth.: ORS Ch.
Hist: NTEC 8, f. 12-20-74, ef. 1-11-75

Statutory Authority and Procedure

345-40-010 These rules carry out and are authorized by ORS 453.455(2), and were adopted pursuant to ORS 183.335.

NOTE: The Chairman of the Nuclear and Thermal Energy Council appointed a State-Wide Siting Task Force in June, 1972, to make recommendations. The Task Force prepared a report and distributed it for comment. Notice of public hearings on the Task Force Report was given by the Council in the Oregon Administrative Rules Bulletin of January 1, 1973. Pursuant to this notice, hearings were held in Portland, Medford, Eugene, and Pendleton. Subsequent to these hearings, revisions were made in the Task Force Report, which was again distributed for comment. Public notices of proposed rulemaking were given by the Council in the Oregon Administrative Rules Bulletin of March 15, 1974, and April 15, 1974. Public hearings were held on the Council's State-Wide Siting Task Force Report in Tillamook, Coos Bay, Klamath Falls, Ontario, Albany, Eugene, and Portland pursuant to these notices. Written comments were solicited from interested members of the public. The rules were adopted by the Council at meetings held on August 13, 1974, August 30, 1974, September 10, 1974, October 15, 1974, November 26, 1974, and December 10, 1974.

Stat. Auth.: ORS Ch.
Hist: NTEC 8, f. 12-20-74, ef. 1-11-75

Incorporation by Reference

345-40-015 (1) A certified copy of the Oregon Nuclear and Thermal Energy Council State-Wide Siting Task Force Report dated July, 1974, (the "July, 1974, Task Force Report") was filed with the Secretary of State concurrently with the filing of these rules. Those portions of the "July, 1974, Task Force Report" referred to specifically in these rules are hereby incorporated herein by reference.

(2) A certified copy of a map dated November 1, 1972, prepared by the State Department of Geology and Mineral Industries and entitled "NTEC Siting Classifications Based Upon Geologic Factors" (the "November 1, 1972, SGMI Map") was filed with the Secretary of State concurrently with these rules. Those portions of such map referred to specifically in these rules are hereby incorporated herein by reference.

(3) A legal description of the area contained in Newberry Crater, North Paulina Roadless Area, South Paulina Roadless Area and Lava Cast Forest, all in the Deschutes National Forest, prepared by the United States Forest Service (the "Forest Service Description"), was filed with the Secretary of State concurrently with the filing of the November, 1975 amendments to these rules. As referred to specifically in these rules, the "Forest Service Description" is hereby incorporated by reference. (See Appendix 1 at the end of this division).

[Publications: The publication(s) referred to or incorporated by reference in this rule is available from the office of Secretary of State or Energy Facility Siting Council.]

Stat. Auth.: ORS Ch.
Hist: NTEC 8, f. 12-20-74, ef. 1-11-75; EFSC 11, f. & ef. 1-5-76

Effect of Designations

345-40-020 (1) The Council will review applications for site certificates for sites within areas designated as "suitable" for location of thermal power plants, pursuant to ORS 453.355.

(2) The Council will not accept applications for site certificates for sites within areas designated as "unsuitable" for location of thermal power plants.

(3) The designations herein of areas as "suitable" or "unsuitable" may be amended by the Council in the future, either on its own motion or pursuant to petitions filed under ORS 183.390.

Stat. Auth.: ORS Ch.
Hist: NTEC 8, f. 12-20-74, ef. 1-11-75

Designations for Geothermal Power Plants

345-40-030 All areas in Oregon are designated "suitable" for use as sites for geothermal power plants except that:

(1) Areas identified as "less suitable" or "unsuitable" in the section entitled "Natural Resource Areas" on page 1-1 through 1-14 and 1-22 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for geothermal power plants; and

(2) Areas identified by other appropriate jurisdictions as presenting significant conflicts with geothermal development may be declared by the Council to be "unsuitable" for use as sites for geothermal power plants.

(3) The Newberry Crater Area containing Newberry Crater, North Paulina Roadless Area, South Paulina Roadless Area, and Lava Cast Forest as identified in the Forest Service description is designated "unsuitable" for use as sites for geothermal power plants.

[Publications: The publication(s) referred to or incorporated by reference in this rule is available from the office of Secretary of State or Energy Facility Siting Council.]

Stat. Auth.: ORS Ch.
Hist: NTEC 8, f. 12-20-74, ef. 1-11-75; NTEC 11, f. & ef. 1-5-76

Designations for Nuclear-Fueled and Fossil-Fueled Thermal Power Plants

345-40-040 (1) Eastern Oregon. The area between the crest of the Cascade range and the Oregon-Idaho border is designated "suitable" for use as sites for nuclear-fueled and fossil-fueled thermal power plants except that:

(a) Areas identified as "less suitable" or "unsuitable" in the section entitled "Natural Resource Areas" on pages 1-1 through 1-14 and 1-22 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for thermal power plants;

(b) Areas identified by the methods described in the section entitled "Population Proximity" on pages 3-1 through 3-10 of the "July, 1974, Task Force Report" resulting in a calculated population proximity greater than 10,000 are designated "unsuitable" for the use of sites for nuclear-fueled power plants;

(c) Areas identified as "less suitable" in the section entitled "Meteorology" on pages 2-1 and 2-2 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for fossil-fueled thermal power plants. These areas are further identified as follows:

(A) John Day Valley Air Shed — All area enclosed by a line beginning at the NW corner of T8S, R23E; proceeding southerly along the western edge of R23E to the SW corner of T12S, R23E; thence easterly to the SE corner of T12S, R23E; then a direct line to the SE corner of T14S, R26E; thence easterly along the southern boundary of T14S to the SE corner T14S, R34E; thence northerly to the NE corner of T14S, R34E; thence easterly to the SE corner of T13S, R34E; continuing northerly to the NE corner of T12S, R34E; thence westerly along the northern boundary of T12S to the SE corner of T11S,

R26E; thence northerly along the eastern boundary of R26E to the NE corner of T9S, R26E; thence west-north-westerly on a line direct to the NE corner of T8S, R24E; thence along the northern boundary of T8S to the point of beginning (NW corner of T8S, R23E).

(B) Grande Ronde, Baker, and Snake River Valleys Air Shed — All area enclosed by a line beginning at the NW corner of T1N, R38E; thence southward along the western boundary of R38E to the SW corner of T1S, R38E; thence southwesterly on a line direct to the NW corner of T3S, R36E; thence south-easterly to the SE corner of T3S, R36E; thence easterly along the southern boundary of T3S, to the SE corner of T3S, R38E; thence southerly along the western boundary of R38E to the SW corner of T8S, R38E; thence south-easterly to the SE corner of T14S, R39E; continuing south-easterly then to the SE corner of T21S, R43E; thence easterly along the southern boundary of T21S to the Oregon-Idaho border; thence northerly along the Oregon-Idaho border to the northern boundary of T8S; thence westerly along the northern boundary of T8S to the NW corner of T8S, R44E; thence north-westerly to the NW corner of T6S, R42E; continuing north-westerly to the NW corner of T2S, R41E; thence northerly along the eastern boundary of R40E to the NE corner of T2N, R40E; thence west-south-westerly on a line direct to the point of beginning (NW corner of T1N, R38E).

(d) Areas identified as "unsuitable" on the "November 1, 1972, SGMI Map" are designated "unsuitable" for use as sites for nuclear-fueled thermal power plants; and

(e) The total amount of Class I, II, III, IV, V, and VI agricultural land (according to U.S. Soil Conservation Service classifications) removed from potential productive capability by the development of thermal power plants and associated facilities, including such lands encompassed by site certificate applications in process, shall not exceed 25,000 acres.

(f) The Newberry Crater Area containing Newberry Crater, North Paulina Roadless Area, South Paulina Roadless Area, and Lava Cast Forest as identified in the Forest Service description is designated "unsuitable" for use as sites for thermal power plants.

(2) Oregon Coast. The "Oregon Coastal Zone", as defined in ORS 191.110(4), is designated "suitable" for use as sites for nuclear-fueled and fossil-fueled thermal power plants except that:

(a) Areas identified as "less suitable" or "unsuitable" in the section entitled "Natural Resource Areas" on pages 1-1 through 1-14 and 1-22 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for thermal power plants;

(b) Areas identified as "unsuitable" in the section entitled "Natural Resource Areas" on pages 1-14 through 1-20 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for thermal power plants;

(c) Areas identified by the methods described in the section entitled "Population Proximity" on pages 3-1 through 3-10 of the "July, 1974, Task Force Report" resulting in a calculated population proximity greater than 10,000 are designated "unsuitable" for use as sites for nuclear-fueled power plants;

(d) The area identified as "unsuitable" on the "November 1, 1972, SGMI Map" is designated "unsuitable" for use as sites for nuclear-fueled thermal power plants;

(e) Areas which are adjacent to the Columbia River and downstream from Puget Island are designated "unsuitable" for use as sites for thermal power plants; and

(f) The total amount of Class I, II, III, and IV agricultural land (according to U.S. Soil Conservation Service classifications) removed from potential productive capability by the development of thermal power plants and associated facilities shall not exceed 1,500 acres.

(3) Western Interior Oregon. The area between the crest of the Cascade range and the Oregon Coastal Zone is designated "suitable" for use as sites for nuclear-fueled and fossil-fueled thermal power plants except that:

(a) Areas identified as "less suitable" or "unsuitable" in the section entitled "Natural Resources" on pages 1-1 through 1-14 and 1-22 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for thermal power plants;

(b) Areas identified by the methods described in the section entitled "Population Proximity" on pages 3-1 to 3-10 of the "July, 1974, Task Force Report" resulting in a calculated population proximity greater than 10,000 are designated "unsuitable" for the siting of nuclear-fueled power plants;

(c) Areas which consist of greater than 33% prime agricultural land, identified as Class I, II, or III by the U.S. Soil Conservation Service, are designated "unsuitable" for use as sites for thermal power plants; and

(d) Areas identified as "less suitable" in the section entitled "Meteorology" on pages 2-1 and 2-2 of the "July, 1974, Task Force Report" are designated "unsuitable" for use as sites for fossil-fueled thermal power plants. These areas are further identified as follows:

(A) Willamete Valley — All of Benton, Clackamas, Columbia, Linn, Marion, Multnomah, Polk, Washington, and Yamhill Counties, and that portion of Lane County east of an extension of the Lincoln-Benton County line.

(B) Umpqua Valley — That area defined by OAR Chapter 340, section 340-21-010(2).

(C) Rogue Valley — That area defined by OAR Chapter 340, section 340-21-010(3).

[Publications: The publication(s) referred to or incorporated by reference in this rule is available from the office of Secretary of State or Energy Facility Siting Council.]

Stat. Auth.: ORS Ch.

Hist: NTEC 8, f. 12-20-74, ef. 1-11-75; EFSC 11, f. & ef. 1-5-76

Oregon

WATER
RESOURCES
DEPARTMENT

December 12, 1995

John G. White
Department of Energy
625 Marion Street N.E.
Salem, OR 97310

REFERENCE: Application G-13711, Newberry Geothermal Project

Dear Mr. White,

Your December 5, 1995, memo requests an agency report on the referenced project. The WRD's review of the proposed water use is essentially complete. We will issue a permit for the proposed use when outstanding permit recording fees are submitted.

Attached is a WRD final order on the C E Exploration Co. water use application. We processed this application and issued our own final order after your office informed us, in a August 30, 1995, letter, that the WRD needed to make an independent decision on the application. The application was processed according to the procedures set out by the 1995 Legislature in Senate Bill 674, which amended ORS Chapter 537.

The draft permit lists a number of conditions which address our concerns with the proposed water use.

I hope this addresses your informational needs. Please call if I can be of any assistance.

Sincerely,

Michael J. Mattick

MICHAEL J. MATTICK
Water Rights Specialist

MJM:

enclosure: Final Order for G-13711

cc: David McClain

Commerce Building
158 12th Street NE
Salem, OR 97310-0210
(503) 378-3739
FAX (503) 378-8130

Agency Report Response Form

Newberry Geothermal Pilot Project
Application for Site Certificate

To: John G. White, Newberry Geothermal Project Officer
Oregon Department of Energy
625 Marion St. NE, Salem, OR 97310

From: Michael J. Mattick
(Your name)

Oregon Water Resources Department
(Your agency)

Date: 12-12-95

The above-named agency has reviewed the Application for Site Certificate for the Newberry Geothermal Pilot Project. We have also reviewed OAR 345-21-060 and the applicable rules, statutes, ordinances, and permitting requirements administered by our agency. We are aware that this report will become part of the record of decision for the Application for Site Certificate and that any issues we wish to raise for the purpose of the contested case must be raised in person of in writing in the public hearing of the draft proposed order. We report as follows:

[*Please mark each of the following statements that are true for your agency or attach a letter of explanation.*]

____ **This agency does not issue any permits that apply to the proposed facility.**
[*If your agency must issue permits related to the proposed facility, please attach a letter describing the current status of applications that have been filed for those permits.*]

____ **This agency has no issues to raise that we consider significant.**
[*Please attach a letter identifying any significant issues your agency desires to raise.*]

____ **This agency administers no statutes, rules or ordinances that apply to the proposed facility.**
[*If your agency administers applicable statutes, rules or ordinances, please attach a letter stating your agency's preliminary conclusions concerning the proposed facility's compliance.*]

X **This agency proposes no conditions for the site certificate.** See Attached Final Order and Draft Permit
[*Please attach a letter listing any conditions you would propose.*]

____ **This agency has no other information to report.**
[*Please attach a letter including any other information that would be useful in reviewing the application in light of the applicable standards.*]

Michael J. Mattick
(signature)

G 13711

Oregon

DEPARTMENT OF ENERGY

Date: December 5, 1995

To: Reviewing Agencies

From: John G. White JGW
Newberry Geothermal Project Officer

Subject: Newberry Geothermal Pilot Project

Thank you for reviewing the site certificate application submitted by CE Newberry, Inc, for a proposed geothermal energy facility. Our agency has now determined the application to be complete, and the application has been filed effective December 5, 1995. Under separate cover you will receive an addendum volume supplementing the original 2-volume application you received in July. Most of you received an advance memorandum from me in September or October requesting that you proceed with substantive review and submit your agency report. "Substantive review" is completed by submitting to the Oregon Department of Energy and to the applicant an agency report that includes the information listed in OAR 345-21-060 (see below).

By statute, the Energy Facility Siting Council has a limited time to act on the application. Now that application has been filed, the time schedule for receiving agency reports is short. **We need to receive your agency report by Monday, December 18, 1995.** If possible, please fax your agency report to us sooner. The attached form is provided to help you respond quickly.

Administrative Rules Authorizing This Request

Reports from Other Agencies

345-21-060 Prior to the date specified in the notification described in OAR 345-15-200, each reviewing agency shall submit to the department and mail to the applicant a report containing the following information:

(1) The status of applications, if any, for permits that have been filed with the reviewing agency and that must be issued by the reviewing agency if a Site Certificate is granted for the proposed facility;

(2) Identification of issues raised in the report that the agency considers to be significant;

(3) Its preliminary conclusions concerning the proposed facility's compliance with state statutes, administrative rules or ordinances administered by the reviewing agency;

(4) A preliminary list of conditions that the reviewing agency proposes for inclusion in the Site Certificate; and

John A. Kitzhaber
Governor

625 Marion Street NE
Salem, OR 97310
(503) 378-4040
FAX (503) 373-7806
Toll-Free 1-800-221-8035

15 1/10 & 15 1/11

Oregon

DEPARTMENT OF ENERGY

RECEIVED
AUG 31 1995
WATER RESOURCES
SALEM, OREGON

August 30, 1995

Mr. Michael Mattick
Water Resources Department
158 12th Street, NE
Salem, Oregon 97310

Re: Newberry Geothermal Pilot Project

Dear Michael:

I am writing to make sure you are aware of a fact that I had overlooked until now. In our previous conversations, I had assumed that the process of issuing the water right would be folded into the site certificate process of the Energy Facility Siting Council. The applicant on the water right applications contained in the site certificate application, however, is CE Exploration Company. The applicant for the site certificate is CE Newberry, Inc., which is a different entity. From the Council's perspective, then, the project involves a third party water right. The Council will not be in a position to bind the Water Resources Department with respect to issuance of the water right to CE Exploration Company.

Your department will need to make the water right decision independent of the Council process. The Council, in turn, will need to have a basis for determining that CE Exploration Company has a reasonable likelihood of obtaining the necessary rights to appropriation of ground water and that CE Newberry, Inc., has a reasonable likelihood of entering into a contractual or other arrangement with CE Exploration to supply and water to the facility, as required under OAR 345-22-010(2).

Sincerely Yours,

John G. White
Newberry Geothermal Project Manager

cc: Walter Perry

John A. Kitzhaber
Governor

625 Marion Street NE
Salem, OR 97310
(503) 378-4040
FAX (503) 373-7806
Toll-Free 1-800-221-8035

WaterWatch file

RIVERS NEED WATER

RECEIVED
OCT 23 1995
WATER RESOURCES DEPT.
SALEM, OREGON

Delivered via FAX and Regular Mail

October 20, 1995

Steven Applegate
Water Resources Department
158 12th Street NE
Salem, OR 97310

RE: Public Notice for Application G-13711, CE Exploration

Dear Mr. ~~Applegate~~ Steve:

The public notice of the Initial Review (IR) for application G-13711 was sent out on September 5, 1995. According to Senate Bill 674 B, this notice begins the 30 day public comment period. That made the close of the comment period for this application October 5, 1995.

The public notice of the Proposed Final Order for application was September 26, 1995. This was 10 days before the close of the public comment period. There is no statutory authority allowing a PFO to be issued before the end of the comment period.

This action has basically made a mockery of the public comment period as set forth in Senate Bill 674. The public comment period allows individuals, public interest groups, and/or state and federal agencies to submit their concerns about the effects of individual water right requests to the Department. These comments should be an important component in the Department's review of the pending application. Often times individuals, groups or agencies have the expertise and/or time to spot issues that the Department, because of limited resources, may not be aware of. While there is no statutory mandate requiring individual replies from the Department, comments are to be considered in the decision making process before the PFO is issued.

A full 30 day public comment period is required by law. In order to comply with the public comment mandate of SB 674 B, the Department must renotice this application, beginning at the IR stage. To decline to do so would not only be a violation of the public comment provisions of SB 647 B, but it would be in blatant disregard to the public's interest in the water resource and would inhibit the public's ability to participate in the water allocation process.

Please notify us as soon as possible about your actions regarding this application.

Sincerely,

K. Priestley

Kimberley Priestley
Legal/Policy Analyst

WaterWatch of Oregon • 213 Southwest Ash, Suite 208 • Portland, OR 97204
Phone: (503) 295-4039 Fax: (503) 295-2791 Email: watrwtch@teleport.com

WATER RESOURCES DEPARTMENT

INTEROFFICE MEMO

March 27, 1995

To:Files g-13710 and G-13711

From: M. Mattick

Subject: Questions and answers about the applications

I called David W. McClain, the project manager today, with three questions.

1. How much water are they asking for? Each application requests a quantity of water greater than the described pumps can deliver.

Ans. Process the applications assuming that the requested amount (the grater amount) will be used. While they anticipate installing 200 gpm pumps to begin with, larger pumps may be installed later if the resource can handle it.

2. Can they accept a limitation of 200 gpm per well or would they need 1600 gpm from each well?

Ans. They would like to pump at a rate not to exceed 1600 gpm from as few a number of wells as necessary. If they could get it all from one, they would. But I don't think they believe that is possible, so they plan on drilling 6 wells.

3. Do they know how shallow they might stop drilling if they find water?

Ans. His gut feeling is that they would seal out any water shallower than 200 feet. He was not sure if he wanted promise to seal deeper. He recommended that I call Dennis Olmstead @ DOGAMI 731-4100 and Dennis Davis @ BLM in Prineville 447-8739 (a hydrogeologist). He gave me the impression that he may be required to live with a similar determination that these people may have already made and that they may have a better idea of the depth of the aquifer being aimed for. He agreed that at this point he expects to find water in the 700 foot area, but would like to stop sooner if an adequate resource was found.

Additional information:
G-13710 is for 400 GPM. The primary use of the well is for construction. It may also be used to provide cooling water if necessary but they hope that it is not.

The 1600 gpm used for cooling will be lost to evaporation. It is all a consumptive use. If the wells cannot produce enough water, they plan on using water, condensed from steam, from the production wells.

STATE OF OREGON
WATER RESOURCES DEPARTMENT
WATER RIGHTS DIVISION

Before the Director of the Water Resources Department

In the matter of	)	PROPOSED
Groundwater Application	)	FINAL
G-13711 submitted by	)	ORDER
C E EXPLORATION CO.		

FINDINGS OF FACT

Water Use Request

1. C E EXPLORATION CO. requested use of 1,600 GPM of water from 6 WELLS in the PAULINA CREEK BASIN, within the DESCHUTES BASIN, for INDUSTRIAL USE AT A GEOTHERMAL POWER PLANT.

2. The area of proposed use is in DESCHUTES County within SECTION 21, T 21 S, R 12 E, SECTIONS 11, 14, 15, 21, 22, 28, T 21 S, R 12 E, AND SECTIONS 4, 9, T 22 S, R 12 E, WM.

3. The water delivery system is described by the applicant as follows: SIX WELLS WITH 4" PIPELINE FROM EACH WELL TO PROJECT AREA. EACH WELL TO HAVE A 6 CHC, 11 STAGE GOULD SUBMERSIBLE PUMP, 60 HP, 460 VOLT, 200 AT GPM.

4. The request was made in Application G-13711 which was received by the Water Resources Department on JUNE 10, 1994.

Affected Waters

1. This proposed use of groundwater above the Deschutes River, a State Scenic Waterway.

2. There are no senior water rights from this point of appropriation.

Department Actions

1. The application was determined to be complete and not defective.

2. The Department determined, based upon OAR 690-09, that the proposed groundwater use will, if properly conditioned, adequately protect the surface water from interference.

3. At this time the Department is unable to find that there is a preponderance of evidence that the proposed use of ground water will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife.

Assessment

1. A technical review report was not prepared for this application.

2. In proceeding with evaluation of Application G-13711, the following criteria were found to be relevant by the Department.

a. The Basin Program (OAR Chapter 690, Division 505)
b. The Revised Report Newberry Geothermal Project Hydrology Baseline Study (May 4, 1994)
c. USGS Open File Report # 94-122
d. Groundwater availability as determined by the Groundwater/Hydrology staff (OAR Chapter 690, Division 9)
e. Effect of use on Deschutes River scenic Waterway as determined by Groundwater/Hydrology staff
f. Pending, senior applications and existing water rights of record
g. Comments received

CONCLUSIONS OF LAW

1. The period of allowed use is YEAR ROUND.

2. The Department finds that no more than 1,600 GPM would be necessary for the proposed use. The amount of water requested, 1,600, is allowed for the proposed INDUSTRIAL USE.

3. A Land Use Information Form from local a government planning office was not required for this application because the proposed wells and places of use are all on Federal lands.

4. The proposed use would not conflict with existing water rights, and, if exercised in accordance with law, rule, and the proposed conditions would not result in injury to existing water users.

5. The proposed use complies with all other rules of the Commission.

6. Pursuant to ORS 390.835, the proposed use, as conditioned, will not reduce streamflows needed to maintain the free-flowing character of the Deschutes River Scenic Waterway in quantities necessary for recreation, fish and wildlife uses.

7. Pursuant to Chapter 416, Oregon laws, 1995, enacted by the 68th Oregon Legislative Assembly, and given the findings listed above, a rebuttable presumption has been established that the use will not impair or be detrimental to the public interest if exercised in the manner described in the attached draft permit.

8. Therefore, the proposed use, as conditioned, and described in the attached draft permit, would not impair or be detrimental to the public interest.

PROPOSED ORDER

IT IS PROPOSED that Application G-13711 in the name of C E EXPLORATION CO. be approved for industrial use as provided on the attached draft permit.

Dated September 26th , 1995

Steven P. Applegate
Administrator
Water Rights and Adjudications Division

NOTICE:
This Proposed Final Order is issued by the Department pursuant to Chapter 416, Oregon laws, 1995, enacted by the 68th Oregon Legislative Assembly.

To seek changes in this proposed final order, you must file a formal protest.

Formal protests to this proposed final order must be made in proper form and accompanied by the statutory fee in the amount of $200. Note: The applicant is not subject to this fee.

For other than the applicant, if you agree with the findings in this proposed order, but wish to maintain your right to participate in any contested case proceeding or judicial review, you must file a written request for standing. Requests for standing in proceedings relating to this application must be made in the proper form and accompanied by the statutory fee in the amount of $50.

Protests or requests for standing, along with the appropriate fees must be received by the Water Resources Department in Salem, Oregon by 5:00 pm on November 10th, 1995.

Only the applicant and any persons who timely file a protest or request for standing may participate in further proceedings before the Department or the Commission which deal with this Application.

DRAFT

STATE OF OREGON

COUNTY OF

DRAFT PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS DRAFT PERMIT IS HEREBY ISSUED TO

C E EXPLORATION CO.
34 NW FIRST AVENUE, SUITE 302
PORTLAND, OREGON 97209

The specific limits for the use are listed below along with conditions of use.

APPLICATION FILE NUMBER: G-13711

SOURCE OF WATER: 6 WELLS within the PAULINA GREEK basin

PURPOSE OR USE: INDUSTRIAL USE AT A GEOTHERMAL POWER PLANT

QUANTITY: 3.565 CFS (1,600 GPM)

SEASON OF USE: YEAR ROUND

DATE OF PRIORITY: JUNE 10, 1994

POINT OF DIVERSION LOCATION:

WELL #1: SENW SECTION 21 BEING 1980 FEET SOUTH AND 1980 FEET EAST OF NW CORNER SECTION 21
WELL #2: SESE SECTION 21 BEING 4620 FEET SOUTH AND 4620 FEET EAST OF NW CORNER SECTION 21
WELL #3: NENW SECTION 28 BEING 4620 FEET NORTH AND 1980 FEET EAST OF SW CORNER SECTION 28
WELL #4: NWSE SECTION 16 BEING 1980 FEET NORTH AND 3300 FEET EAST OF SW CORNER SECTION 16
WELL #5: SENE SECTION 20 BEING 1980 FEET SOUTH AND 660 FEET WEST OF NE CORNER SECTION 20
WELL #6: SENE SECTION 29 BEING 3300 FEET NORTH AND 660 FEET WEST OF SE CORNER SECTION 29 ALL IN T 21 S, R 12 E, W.M.

THE PLACE OF USE IS LOCATED AS FOLLOWS:

COOLING TOWERS SENW
NESW
SECTION 21
T 21 S, R 12 E, WM

GEOTHERMAL DRILL SITES
SECTIONS 11, 14, 15, 21, 22, 28
T 21 S, R 12 E, WM

SECTIONS 4
T 22 S, R 12 E, WM

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

This use may be regulated if analysis of data available after the permit or certificate is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The PERMITTEE shall develop a plan to monitor and report the impact of water use under this permit on water levels within the aquifer that provides water to the permitted well(s). The plan shall be submitted to the Department within one year of the date the permit is issued and shall be subject to the approval of the Department. At a minimum, the plan shall include a program to periodically measure static water levels within the permitted well(s) or an adequate substitute such as water levels in nearby wells. The plan shall also stipulate a reference water level against which any water-level declines will be compared. If a well listed on this permit displays a total static water-level decline of 25 or more feet over any period of years, as compared to the reference level, then the PERMITTEE shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s). Such action shall be taken until the water level recovers to above the 25-foot decline level or until the Department determines, based on the PERMITTEE'S or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The PERMITTEE shall in no instance allow excessive decline to occur within the aquifer as a result of use under this permit.

STANDARD CONDITIONS

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Actual construction of the well shall begin within one year from permit issuance, and shall be completed on or before October 1, 1997. Complete application of the water to the use shall be made on or before October 1, 1998.

Issued _____, 1995

DRAFT

_____
Water Resources Department
Martha O. Pagel
Director

Oregon

DEPARTMENT OF ENERGY

Date: September 8, 1995

To: Reviewing Agencies

From: John G. White JGW

Subject: Newberry Geothermal Pilot Project

Thank you for reviewing the site certificate application submitted by CE Newberry, Inc, for a proposed geothermal energy facility. You have reported that the application is complete for the purposes of your agency's substantive review. Please proceed now with that substantive review and submit your agency report as soon as possible.

Action Requested

To fulfill the legal requirement of reviewing agency participation in the energy facility siting process, we need to receive your agency report. Please note that your comments, recommendations and reports will be part of the legal record for this application. "Substantive review" is accomplished by submitting to the Oregon Department of Energy (ODOE) and to the applicant an agency report that includes the following information:

(1) The status of applications, if any, for permits that have been filed with the reviewing agency and that must be issued by the reviewing agency if a Site Certificate is granted for the proposed facility;

(2) Identification of issues raised in the report that the agency considers to be significant;

(3) Its preliminary conclusions concerning the proposed facility's compliance with state statutes, administrative rules or ordinances administered by the reviewing agency;

(4) A preliminary list of conditions that the reviewing agency proposes for inclusion in the Site Certificate; and

(5) Any other information that the reviewing agency believes will be useful in reviewing the application in light of applicable standards.

John A. Kitzhaber
Governor

625 Marion Street NE
Salem, OR 97310
(503) 378-4040
FAX (503) 373-7806
Toll-Free 1-800-221-8035

Oregon Administrative Rule 345-21-060 requires that you submit the agency report prior to the date specified in ODOE's notification that the site certificate application is complete and has been filed. **ODOE has not yet determined the application to be complete in all respects, and the application has not yet been "filed."** Because you have indicated that the application is complete for the purposes of your agency report, we request that you prepare and submit the report as soon as possible. You will receive formal notification, and a specific agency report deadline, when the application is filed.

We are providing this advance request for your agency report because we anticipate very limited time will be available for preparation of agency reports after the application filing date. The deadline for reviewing agency reports will be approximately 14 days after the application is filed.

You may conclude that your agency has no comments on this application or that some or all of the information items listed above do not apply to your agency. If so, we still request a brief agency report in which you confirm those conclusions.

Response
Please mail your agency report to:

John G. White
Oregon Department of Energy
625 Marion St. NE
Salem, OR 97310

and

David McClain
CE Newberry, Inc.
34 NW First Avenue, Suite 302
Portland, OR 97209

Questions
If you have questions about how to prepare your agency report or if you need further information about the proposed energy facility, please contact: John G. White, Newberry Geothermal Project Officer, Oregon Department of Energy, 503-378-3194.

INITIAL REVIEW CHECKLIST

APPLICATION # G 13711
WAB # _____
POU-WAB _____

✓ ITEMS HAVE BEEN VERIFIED ON COMPLETENESS CHECKLIST
N/A BASIN NAME/NUMBER IS CORRECT

DETERMINATION OF WHETHER USE IS OR IS NOT ALLOWED BY...
✓ BASIN PLAN
N/A LEGISLATIVE WITHDRAWAL (ORS 538)
_____ RULES
✓ SCENIC WATERWAY (OTHER THAN WA ORS 390.826)
_____ OTHER WASTEWATER DISPOSAL

N/A WATER AVAILABILITY HAS BEEN CHECKED
NOT IN CONNECTION 50 % BEFORE JULY 17, 1992; 80 % LIVE FLOW 50 % STORAGE AFTER JULY 17, 1992

N/A INSTREAM WATER RIGHT EXEMPTIONS ARE DOCUMENTED ON WATER AVAILABILITY SHEETS

N/A USE IS NOT FROM A BOR PROJECT OR A SIGNED CONTRACT IS IN THE FILE

DIVISION 33 HAS BEEN ADDRESSED...
✓ SEASON FOR DIRECT FLOW
N/A WATER QUALITY PARAGRAPH
✓ EFFICIENCY DESCRIPTION (BELOW BONN AND MORE THAN 1 CFS)

✓ PLAT CARDS HAVE BEEN CHECKED AND A COPY OF THE MAP SHOWING THE CONFLICT HAS BEEN ATTACHED

✓ ALL DOCUMENTS USED IN EVALUATION ARE ATTACHED AND HIGHLIGHTED AND PACKET IS STAPLED TOGETHER

_____ SPELL CHECK HAS BEEN COMPLETED

12 WATERMASTER #

_____ REGIONAL MANAGER (NW,SW,NC,(SC),E)

_____ LETTER WAS SAVED FROM M:\T\IRWORK95 TO M:\T\IRSENT95

NAME Larry Smythe
DATE 8/14/95

OREGON WATER RESOUCES DEPARTMENT
ADMINISTRATIVE RULES
CHAPTER 690
DIVISION 505
DESCHUTES BASIN PROGRAM

Upper Deschutes Basin

690-505-001

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Upper Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Upper Deschutes River Basin are hereby so classified with the following exception:

The maximum economic development of this state, the attainment of the highest and best use of the waters of the natural lakes of the Upper Deschutes River Basin, except for Crescent Lake, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7 1/2 theoretical horsepower, recreation, wildlife and fish life uses and the waters of the natural lakes, Upper Deschutes River Basin, except for Crescent Lake, are hereby so classified.

(b) Applications for the use of the waters of the Upper Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Minimum Perennial Streamflows

(a) To support aquatic life and minimize pollution, in accordance with Section 3, Chapter 796, Oregon Laws, 1983, no appropriation of water shall be made or granted by any state agency or public corporation of the state for waters of the Upper Deschutes River and tributaries when flows are below the levels specified in Table 1. This limitation shall not apply to:

(A) Human and livestock consumption.

Adopted February 20, 1962. Amended May 24, 1962; April 3, 1964; May 26, 1967; July 7, 1978; January 10, 1980; April 1, 1980; April 4, 1981 and November 29, 1984.

(B) Water legally released from storage.

(b) Attainment of the specified flow levels during some portions of the year will require development of water storage or implementation of other measures to augment flows.

(3) Water Quality

Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on the condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

Middle Deschutes River Basin

690-505-002

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Middle Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Middle Deschutes River Basin are hereby so classified with the following exceptions:

(A) OAR 690-505-006, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

(B) The maximum economic development of this state, the attainment of the highest and best use of the waters of the main stem, Metolius River, above river mile 13.0, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or non-commercial garden not to exceed one-half acre in area, power development, recreation, wildlife and fish life uses and the waters of the main stem, Metolius River, above river mile 13.0, are hereby so classified.

(C) Further, no out-of-basin diversions of the waters of the mainstem Metolius River, above river mile 13.0, shall be permitted for any use.

(D) No further appropriations except for domestic or livestock uses shall be permitted for waters of the mainstem Deschutes River, from the head of Lake Billy Chinook near river mile 120 to the North Canal Dam near river mile 165.

(E) The maximum economic development of this state, the attainment of the highest and best use of the waters of the natural lakes of the Middle Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7 1/2 theoretical horsepower, recreation, wildlife and fish life uses.

(b) Applications for the use of the waters of the Middle Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudical to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Minimum Perennial Streamflows

For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life, no appropriations of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters of Lake Creek or its tributaries above the confluence of Lake Creek with the Metolius River for flows of Lake Creek below 20 cubic feet per second measured at the mouth of Lake Creek except that this limitation shall not apply to waters legally stored or legally released from storage (priority date - May 24, 1962).

(3) Water Quality

Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

Lower Deschutes River Basin

690-505-003

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Lower Deschutes River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Lower Deschutes River Basin are hereby so classified with the following exceptions:

(A) OAR 690-505-006, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

(B) The waters of Boulder Lake in Hood River and Wasco Counties are classified only for domestic and livestock uses; power development not to exceed 7-1/2 theoretical horsepower; recreation, wildlife and fish life uses; and irrigation not to exceed 100 acre-feet annually from water stored in the lake.

(C) The maximum economic development of this state, the attainment of the highest and best use of the waters of the other natural lakes of the Lower Deschutes River Basin, and the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, power development not to exceed 7-1/2 theoretical horsepower, recreation, wildlife, and fish life uses and the waters of the natural lakes of the Lower Deschutes River Basin are hereby so classified.

(b) Applications for the use of the waters of the Lower Deschutes River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give cognizance to the multiple-purpose concept.

(2) Minimum Perennial Streamflows

For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life, no appropriations of water except for domestic or livestock uses shall be made or granted by any state agency or public corporation of the state for the waters of the White River or its tributaries above the confluence of White River with the Deschutes River for flows of the White River below the specified flows in Table 2, except that this limitation shall not apply to waters legally stored or legally released from storage.

(3) Water Quality

Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

Upper Crooked River Basin

690-505-004

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Deschutes - Upper Crooked River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Deschutes - Upper Crooked River Basin are hereby so classified.

(b) Applications for the use of the waters of the Deschutes - Upper Crooked River Basin shall not be accepted by any state agency for any other use and the granting of applications for such other uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Water Quality

Rights to use of water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

Lower Crooked River Basin

690-505-005

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Deschutes - Lower Crooked River Basin, and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Deschutes - Lower Crooked River Basin are hereby so classified with the following exceptions:

(A) OAR 690-505-006, Lower Main Stem Deschutes River, adopted April 3, 1964, as modified by the Water Policy Review Board.

(B) No further appropriations of water except for domestic or livestock uses shall be made or granted by any state agency for the waters of Ochoco Creek and its tributaries.

(b) Applications for the use of the waters of the Deschutes - Lower Crooked River Basin shall not be accepted by any state agency for any other use and the granting of applications for such uses is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated and coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the water in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Water Quality

Rights to use water for industrial or mining purposes granted by any state agency shall be issued only on condition that any effluents or return flows from such uses shall not interfere with other beneficial uses of water.

Note: The Upper Deschutes River, Midddle Deschutes River, Lower Deschutes River, Upper Crooked River and Lower Crooked River Basins are delineated on State Water Resources Board Map, File 5.7014, available from the Water Resources Department.

Lower Main Stem Deschutes River

690-505-006

(1) Classifications

(a) The maximum beneficial use of that portion of the main stem of the Deschutes River from its confluence with the Columbia River to and including river mile 100.0 is for recreation, fish and wildlife purposes and no appropriations of water in this area shall be permitted except for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, recreation, fish and wildlife uses.

(b) The maximum economic development of the state and the attainment of the highest and best use of the waters of the lower main stem Deschutes River from river mile 100.0 to river mile 120.0 and the attainment of an integrated and balanced program for the benefit of the state as a whole will be achieved through utilization of the aforementioned waters for domestic, livestock, irrigation of lawn or noncommerical garden not to exceed one-half acre in area, hydroelectric power, fish, wildlife, and recreation purposes and the afore- mentioned waters of the main stem Deschutes River are hereby so classified.

(c) The maximum economic development of this state and the attainment of the highest and best use of the waters of the lower main stem Crooked River from its confluence with the Deschutes River to river mile 6.5 and the waters of the main stem of the lower Metolius River from its confluence with the Deschutes River to river mile 13.0 will be attained through utilization of such waters for domestic, livestock, irrigation of lawn or noncommercial garden not to exceed one-half acre in area, hydroelectric power, fish, wildlife, and recreation purposes and the aforementioned waters of the lower main stem, Crooked River, and lower main stem, Metolius River, are hereby so classified.

(d) Applications for the use of such water shall not be accepted by any state agency for any other purpose and applications for such other purposes are declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated, coordinated program for the use and control of the water resources of the state.

(e) Structures or works for the utilization of the waters in accordance with the aforementioned classifications are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with the applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Power Development

Water rights acquired for structures or works for the utilization of the waters for hydroelectric purposes shall be subordinate to all present and future upstream beneficial uses of water except for hydroelectric power.

Note: The main stem of the Deschutes River from its confluence with the Columbia River to river mile 120.0 is shown in USGS Water Supply Paper 344; the main stem of the Crooked River from its confluence with the Deschutes River to river mile 6.5 is shown on USGS Plans and Profiles, 1926; and the main stem of the Metolius River from its confluence with the Deschutes River to river mile 13.0 is shown in USGS Water Supply Paper 344.

Table 1
Deschutes Basin
Minimum Perennial Streamflows
(cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Priority Date
Deschutes River - to be maintained from Wickiup Reservoir to the confluence of the Little Deschutes River	300	300	300	300	300	300	300	300	300	300	300	300	11-3-83
Deschutes River - to be maintained from Little Deschutes River to the confluence of Spring River	400	400	400	400	400	400	400	400	400	400	400	400	11-3-83
Deschutes River - to be maintained from Spring River to North Canal Dam at Bend	660	660	660	660	660	660	660	660	660	660	660	660	11-3-83

TO: Water Rights Section March 31, 1995

FROM: Groundwater/Hydrology Section K. Lite
Reviewer's Name

SUBJECT: Application G- 13711

GROUNDWATER/SURFACE WATER CONSIDERATIONS

1. PER THE _____ Basin rules, one or more of the proposed POA's is/is not within _____ feet/mile of a surface water source (_____) and taps a groundwater source hydraulically connected to the surface water.

2. BASED UPON 0AR 690-09 currently in effect, I have determined that the proposed groundwater use
   a. ___will, or have the potential for substantial interference with the nearest
   b. ___will not surface water source, namely Paulina Lake ; or
   c. X will if properly conditioned, adequately protect the surface water from interference:
      i. X The permit should contain condition #(s) 4I ;
      ii. ___The permit should contain special condition(s) as indicated in "Remarks" below;
      iii. ___The permit should be conditioned as indicated in item 4 below; or
   d. will, with well reconstruction, adequately protect the surface from substantial interference.

GROUNDWATER AVAILABILITY CONSIDERATIONS

3. BASED UPON available data, I have determined that groundwater for the proposed use
   a. ___will, or likely be available in the amounts requested without injury to prior rights
   b. ___will not and/or within the capacity of the resource; or
   c. X will if properly conditioned, avoid injury to existing rights or to the groundwater resource:
      i. X The permit should contain condition #(s) 4H ;
      ii. ___The permit should contain special condition(s) as indicated in "Remarks" below;
      iii. ___The permit should be conditioned as indicated in item 4 below; or

4. a. ___THE PERMIT should allow groundwater production from no deeper than_____ft. below land surface;
   b. ___The permit should allow groundwater production from no shallower than____ft. below land surface;
   c. ___The permit should allow groundwater production only from the_____ groundwater reservoir between approximately _____ft. and _____ft. below land surface;
   d. ___Well reconstruction is necessary to accomplish one or more of the above conditions.
   e. ___One or more POA's commingle 2 or more sources of water. The applicant must select one source of water per POA and specify the proportion of water to be produced from each source.

REMARKS: _____

(Well Construction Considerations on Reverse Side)

WELL CONSTRUCTION (If more than one well doesn't meet standards, attach an additional sheet.)

5. THE WELL which is the point of appropriation for this application does not meet current well construction standards based upon:
   a.____review of the well log;
   b.____field inspection by _____;
   c.____report of CWRE _____;
   d.____other: (specify) _____
   _____

6. THE WELL construction deficiency:
   a.____constitutes a health threat under Division 200 rules;
   b.____commingles water from more than one groundwater reservoir;
   c.____permits the loss of artesian head;
   d.____permits the de-watering of one or more groundwater reservoirs;
   e.____other: (specify) _____
   _____

7. THE WELL construction deficiency is described as follows: _____
   _____
   _____

8. THE WELL
   a.____was, or
   b.____was not
   constructed according to the standards in effect at the time of original construction or most recent modification.
   c.____I don't know if it met standards at the time of construction.

RECOMMENDATION:

A.____I recommend including the following condition in the permit:
"No water may be appropriated under terms of this permit until the well(s) has been repaired to conform to current well construction standards and proof of such repair is filed with the Enforcement Section of the Water Resources Department."

B.____I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Enforcement Section of the Water Resources Department.

C.____REFER this review to Enforcement Section for concurrence.

THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

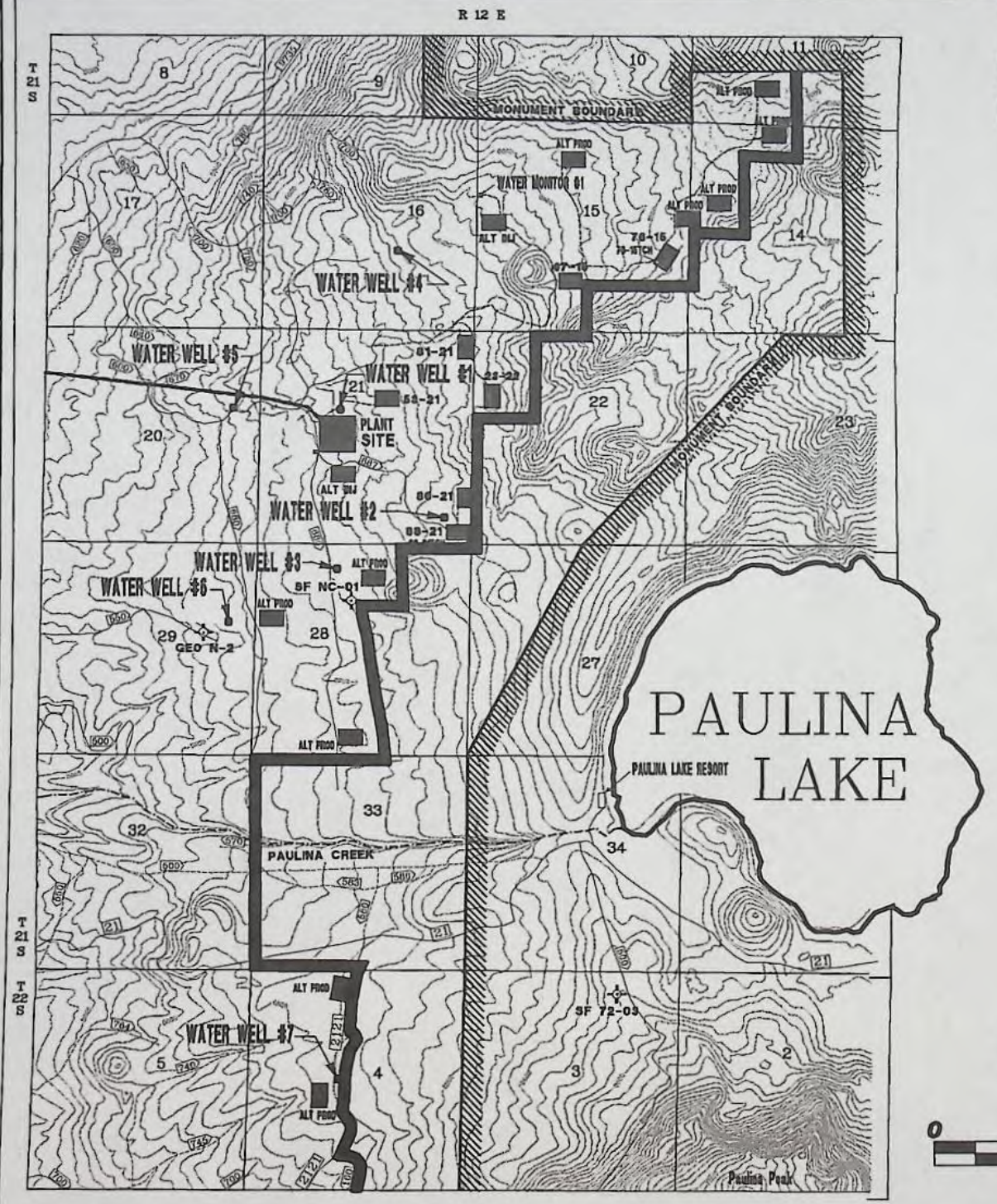
I concur in G/H's recommendation A or B above relating to conditioning or withholding the permit

_____ _____, 199__.
(Signature)

I do not concur in G/H's recommendation A or B above relating to conditioning or withholding the permit for the following reasons:_____
_____
_____

_____ _____, 199__.
(Signature)

G13711 & G13710



WATER USE LOCATION MAP
BROWN WATER APPLICATION
NEWBERRY GEOTHERMAL PROJECT
DESCHUTES CO., OREGON

MAP BY CE EXPLORATION, EDITED FOR WATER RIGHTS BY DAVID EVANS AND ASSOCIATES, INC.

KEY:

- POWER PLANT SITE (900' x 900')
- PRODUCTION/INJECTION PAD (400' x 600')
- PROPOSED WELL COURSE
- PROPOSED TRANSMISSION LINE
- MONUMENT BOUNDARY
- NSO BOUNDARY
- GEO N-2 — DRILL HOLE

RECEIVED
MAY 26 1995
WATER RESOURCES DEPT.
SALEM, OREGON

Certified Water Right Examiner
181 WRD
Jerry C. Powell
May 17, 1988
STATE OF OREGON

RENEWS 1-1-97

THIS MAP IS FOR LOCATING A WATER RIGHT AND IS NOT A BOUNDARY SURVEY DELINEATING PROPERTY RIGHTS.

0 5000 10000
FEET

N

NEWBERRY 05/09/95

TOWNSHIP 21S RANGE 12E W. M. SECTION 29

NE				NW				SW				SE				Application Number	Permit Number	Certificate Number
																G-11784	G-10824	CANCELED
			GEO													G-13711		

Acreage in lot or legal subdivision as shown on government plat. If other than 40 acres

TOWNSHIP 21S RANGE 12E W. M. SECTION 28

NE				NW				SW				SE				Application Number	Permit Number	Certificate Number
						Ind				IND	Ind					G-11784	G-10824	
				GEO												G-13711		

Acreage in lot or legal subdivision as shown on government plat. If other than 40 acres

TOWNSHIP 21S RANGE 12E W. M. SECTION 21

NE				NW				SW				SE				Application Number	Permit Number	Certificate Number
					GEO										GEO	G-13711		

Acreage in lot or legal subdivision as shown on government plat. If other than 40 acres

TOWNSHIP 21S RANGE 12E W. M. SECTION 20

NE				NW				SW				SE				Application Number	Permit Number	Certificate Number
	Ind	Ind		Ind		Ind						Ind			Ind	G-11784	G-10824	
		GEO														G-13711		

Acreage in lot or legal subdivision as shown on government plat. If other than 40 acres

TOWNSHIP 21S RANGE 12E W. M. SECTION 16

NE				NW				SW				SE				Application Number	Permit Number	Certificate Number
													GEO			G-13711		

Acreage in lot or legal subdivision as shown on government plat. If other than 40 acres

Water Resources Department

MEMO August 10, **1995**

TO **Application G-** 13711

FROM K. Lite

SUBJECT **Scenic Waterway Finding**

At this time the Department lacks a preponderance of evidence that the proposed use of ground water will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife.

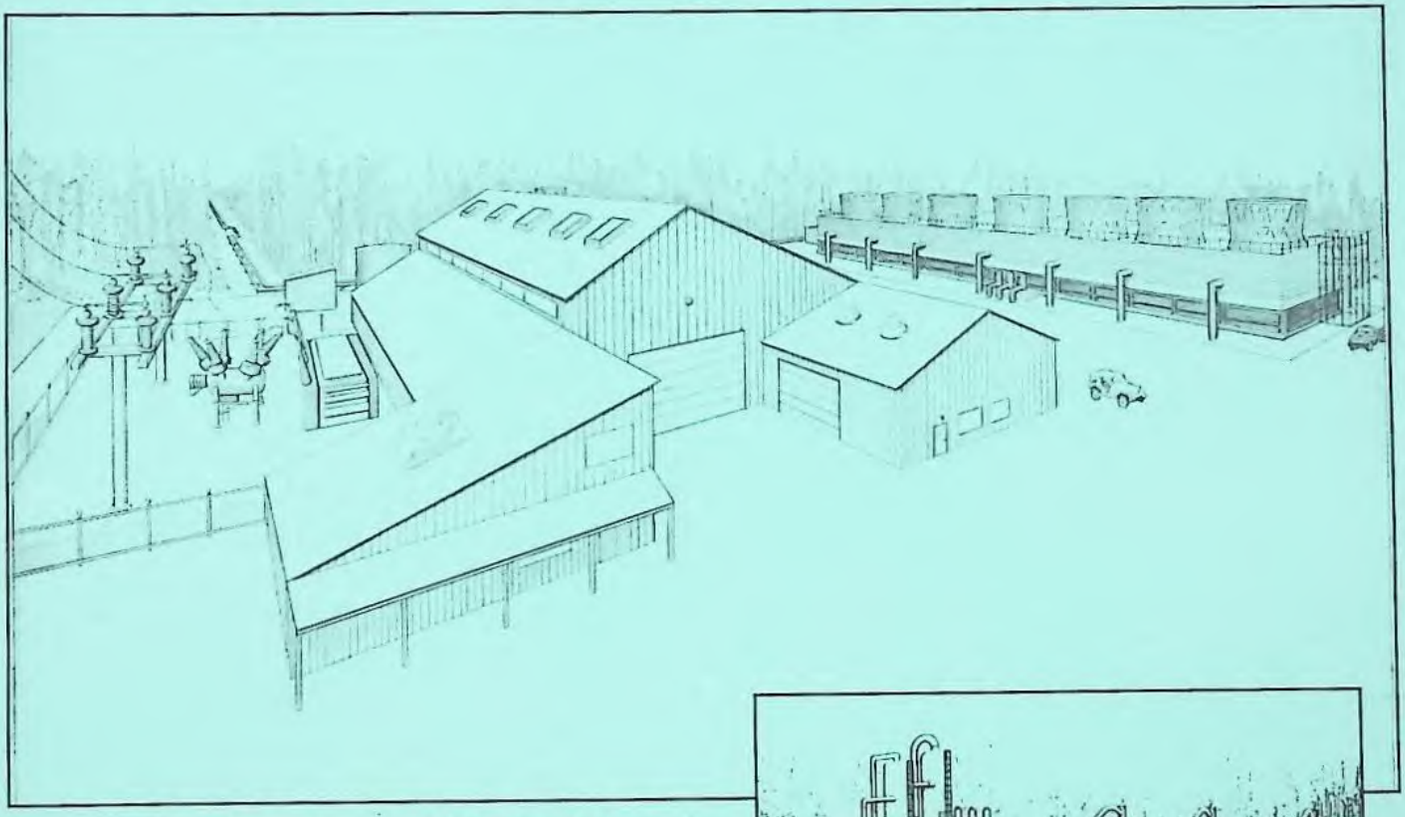
INCLUDE THE FOLLOWING CONDITION IN ANY PERMIT OR CERTIFICATE ISSUED:

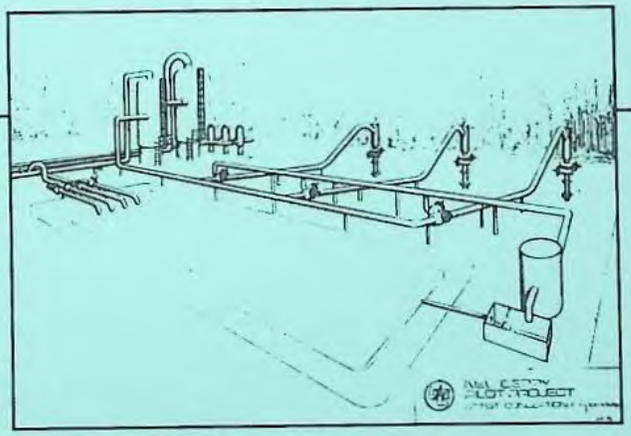
This use may be regulated if analysis of data available after the permit or certificate is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced.

Executive Summary:

Newberry Geothermal Pilot Project

Draft Environmental Impact Statement





CE Exploration Company of Portland, Oregon has submitted a proposal to build and operate a 33-megawatt geothermal power plant in the Deschutes National Forest in Central Oregon. This is the draft version of the environmental analysis of the proposed project, prepared by the U.S. Forest Service, the U.S. Bureau of Land Management, and Bonneville Power Administration.

U.S. Forest Service

Bonneville Power Administration

U.S. Bureau of Land Management

United States Department of Agriculture | Forest Service | Deschutes National Forest | 1645 Highway 20 East Bend, OR 97701

Reply to: 1900

Date: January 18, 1994

Enclosed for your information and review, is an Executive Summary of the Draft Environmental Impact Statement (Draft EIS) for the Proposed Newberry Geothermal Pilot Project. This document is an abbreviated version of the full text of the Draft EIS, and provides a brief overview of the proposed project and the environmental analysis. The Draft EIS describes in much greater detail the proposed project, affected environment, alternatives, and environmental effects of each of the alternatives. If after reviewing the Executive Summary, you would like to receive a copy of the Draft EIS, please contact the Fort Rock Ranger District at at (503) 383-4703 or 388-5664.

Now is the time to comment on the project and the environmental analysis. The 45-day comment period begins January 29, 1994, and ends March 14, 1994. We will evaluate and consider all written comments that are submitted during this period. To be most helpful, your comments should be as specific as possible, and reference pages or sections of the document, if appropriate.

The agencies have identified a preferred alternative at this time, based on the environmental analysis and information provided in this draft document. Your comments will be considered and used as we prepare the Final Environmental Impact Statement, which will be the basis for ultimately deciding which alternative to approve.

"Open houses" will be held in central Oregon during the comment period to offer you the opportunity to stop in and ask questions about the project and take a look at displays. The dates and times for these will be publicized locally, or you may call the Fort Rock Ranger District for more information. Written comments will be accepted during the open houses, or can be submitted any time prior to the close of the comment period.

On behalf of the Bureau of Land Management, Bonneville Power Administration, and the Forest Service, I thank you for your interest and involvement in this project.

Sincerely,

SALLY COLLINS
Forest Supervisor

EXECUTIVE SUMMARY OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED NEWBERRY GEOTHERMAL PILOT PROJECT

Deschutes National Forest
Deschutes County, Oregon
January 1994

Lead Agency: USDA Forest Service
Responsible Official:
Sally Collins
Deschutes Forest Service
1645 Highway 20 East
Bend, OR 97701

For More Information, Contact:
Alice Doremus, Special Projects
Fort Rock Ranger District
1230 NE Third, Suite A262
Bend, OR 97701
(503) 383-4703 or 388-5664

Cooperating Agencies
Bonneville Power Administration, Portland, Oregon
Bureau of Land Management, Prineville, Oregon

Abstract

CEE Exploration Company of Portland, Oregon proposes to build and operate a geothermal pilot project and supporting facilities capable of generating 33 megawatts of electric power in the Deschutes National Forest in central Oregon. The facilities would include a power plant, access roads, exploration and production wells, a power transmission line, and a switchyard. The project would consist of four distinct phases: exploration, development, utilization, and decommissioning. The project would be located on the west flank of Newberry Volcano on Federal geothermal leases.

This Draft Environmental Impact Statement analyzes three alternatives for this proposed geothermal pilot project. Each alternative responds differently to the issues and concerns identified in the EIS process.

Alternative A is the proposal submitted by CEE. It includes a single power plant site, 14 well pads for drilling exploration and development wells, a transmission line, access roads and steam pipelines to bring the steam to the power plant.

Alternative B was developed to respond to the issues and provide siting flexibility to make the most efficient use of the geothermal resources while minimizing environmental effects. Many components are similar to those in Alternative A. Major differences are that it

proposes different siting locations, a different transmission line route and design, and additional mitigation measures. Alternative B is the agencies' Preferred Alternative.

Alternative C is the No Action Alternative.

Reviewers should provide the Forest Service with their comments during the review period of the Draft Environmental Impact Statement. This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the Final Environmental Impact Statement, thus avoiding undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC, 435 U.S. 5 19, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the Final Environmental Impact Statement. City of Angoon v. Hodel (9th Circuit, 1986) and Wisconsin Heritages, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the Draft Environmental Impact Statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).

Please send written comments to:

Newberry Geothermal Pilot Project
(Fort Rock Ranger District USFS)
1230 NE 3rd Street, Suite A-262
Bend, OR 97701

The comment period ends March 14, 1994.

This document is a summary of the Draft Environmental Impact Statement for the Proposed Newberry Geothermal Pilot Project, and contains an abbreviated description of the full analysis.

Location and General Description

CE Exploration Co., (CEE) of Portland, Oregon, has submitted a proposal to the U.S. Forest Service and the Bureau of Land Management (BLM) for geothermal exploration, development, utilization, and decommissioning as part of Bonneville Power Administration's (BPA) Geothermal Pilot Program. The proposed project includes construction and operation of a geothermal power plant, 14 well pads, pipelines, access roads, and a transmission line. The power plant would generate 33 MW of electric energy, and would be located on the west flank of Newberry Volcano, within the Deschutes National Forest in central Oregon. The proposed project would be located on Federal geothermal leases designated as suitable for geothermal development outside the Newberry National Volcanic Monument (NNVM). Figures S-1 and S-2 show a vicinity map and project area map of the proposed geothermal pilot project.

CEE, a subsidiary of California Energy Company, Inc. of Omaha, Nebraska, has entered into an agreement with Eugene Water & Electric Board and BPA to sell the electrical power produced from the project. Under this agreement, EWEB would purchase 10 MW of power and BPA would purchase 20 MW of power.

Purpose and Need

The need for the Federal action is to decide whether to enable the development of the proposal for a geothermal power project at Newberry Volcano. This project would indicate the availability of geothermal power to help meet the region's future energy needs. The U.S. Forest Service, BLM, and BPA are cooperating agencies for the analysis and Environmental Impact Statement under the National Environmental Policy Act (NEPA). The agencies will determine whether the project, or alternatives to the project, should be permitted to proceed. Agency decisions will be documented in Records of Decision (ROD) for the final EIS. If an action alternative is chosen, additional mitigation measures, conditions, and stipulations may be included as part of the decision. Any subsequent actions taken by the agencies to implement the decision must be consistent with the RODs.

Because the proposed project would occur on National Forest lands subject to the legislation that established the NNVM (PL 101-522, November 5, 1990), the agencies agree that the U.S. Forest Service is the lead agency for the analysis and EIS, and that BLM and BPA are cooperating agencies. Each agency has its own specific purposes for involvement.

As lead agency as well as the agency responsible for surface management, the U.S. Forest Service's purpose is to decide whether to approve the proposed project and take action on subsequent approvals and authorizations for surface disturbing activities. BLM is the Federal agency responsible for management and administration of Federal geothermal leases and subsurface activities, pursuant to the Geothermal Steam Act of 1970. BLM's purpose is to decide whether to approve the proposed project and take action on subsequent approvals and authorizations for surface and subsurface activities. BPA is the Federal agency responsible for purchasing, developing, marketing, and transmitting electrical power to utility, industrial, and other customers in the Pacific Northwest, pursuant to the Bonneville Project Act of 1937 and the Northwest Power Planning and Conservation Act of 1980. To fulfill its statutory purposes and test the availability of geothermal energy to provide a reliable, economical, and environmentally acceptable alternative energy source to help meet the region's power needs, BPA will decide whether to take actions to purchase and transmit power from the power plant, if it is decided that the project will proceed.

The objective of the Newberry Geothermal Pilot Project is to demonstrate whether geothermal energy is a feasible alternative source of electricity in the Pacific Northwest to help meet growing regional power demands and needs. Newberry Volcano was proposed because its geothermal resource potential has been recognized in the past, and because the potential for geothermal development has been addressed in the 1990 Deschutes National Forest Land Management Plan, and in the NNVM legislation. This project is consistent with both documents.

Issues Summary

The issues addressed in the environmental analysis came from a variety of sources. A scoping process was used to identify concerns and environmental issues to be addressed in the EIS. Comments were gathered from citizens, government agencies, and public interest groups. Additionally, issues were raised by agency personnel and technical specialists involved with the analysis. Issues were categorized into the following topics:

Geology and Soils	Traffic and Transportation
Water Resources	Vegetation
Geothermal Resources	Wildlife
Climate and Air Quality	Cultural Resources

Visual Resources	Human Health and Safety
Noise	Economic and Social Characteristics
Land Use	Cumulative Effects
Recreation	

Some of the issues were considered to be "key issues" and were used to generate the alternatives. For example, alternatives include different power plant, road or transmission line locations to respond to concerns about impacts on visual quality. Other issues were addressed through mitigation, monitoring or in another manner in the EIS. For example, visual impacts of the power plant and pipelines might be mitigated by constructing them of materials colored to blend in with the background. Issues that can be addressed by monitoring include monitoring of air quality at the plant site and at other locations to insure that pollution is not a problem. Some issues raised were not within the scope of this EIS, and could not be analyzed in this document.

Alternatives at a Glance

Three alternatives are analyzed in the EIS, including the "no action" alternative. The following description summarizes key elements of the alternatives.

The project area for proposed facilities, other than the transmission line, includes Federal geothermal lease areas which are bisected by Paulina Creek. The portion of the lease area which lies south of Paulina Creek would be for exploration purposes only, and would not have any pipelines or roads constructed to connect them with the power plant and other facilities located on the lease areas north of Paulina Creek.

The project in either Alternative A or Alternative B would include construction and operation of a power plant, wells, and supporting facilities, and would consist of four distinct phases. The first phase, "exploration," includes construction of new access roads, upgrading existing roads, and drilling and testing different types of wells on a total of 14 well pads, each up to 2.4 hectares (6 acres) in size. All drilling and surface activity would occur from within the "surface occupancy" (SO) lease areas. Drilling would be directional or slanted, to access drilling targets which lie deep below the adjacent "no surface occupancy" (NSO) lease areas.

Once evaluation of the exploration wells is complete, the "development" phase would begin, if the drilling program is successful and finds a developable geothermal resource. This phase consists of construction of the power plant, pipelines to transmit steam from the well pads to the power plant, access roads, a transmission line and switchyard, as well as continuing development of production wells and well pads. Siting of facilities would make use of existing roads where possible. No facilities would cross Paulina Creek.

The power plant would generate 33 MW of electrical power using "flash" technology with a condensing steam turbine, and a wet cooling tower. With flash technology, electrical power is generated by using steam separated from the hot underground geothermal water to run a turbine. After the water has been used in the power plant and cooled in the cooling tower it will be injected into the geothermal reservoir at locations which will help recharge the underground resource but not interfere with production or use of the reservoir. Figure S-3 illustrates this process in a simplified flow diagram.

The project would include construction of approximately 12.9 km (8 miles) of a 115-kV transmission line from the power plant westward to an existing transmission line west of Highway 97. Construction of a new switchyard, located on BLM lands west of Highway 97, would also be included in the project.

The day-to-day operation of the power plant, well field, and other facilities is the "utilization" phase. This also includes appropriate disposal methods for solid waste, noncondensable gases, and excess geothermal fluids.

The "decommissioning" phase would occur an the end of the commercial life of the facility, which is expected to be approximately fifty years or more. During this phase, structures and equipment would be dismantled and removed, wells would be plugged and abandoned, and the environment would be returned to acceptable conditions.

All activities throughout the life of this project will require approval and authorizations and must comply with all applicable laws, regulations, and the Federal Geothermal Resources Operational Orders. Additionally, a number of mitigation and monitoring elements are included in both Alternative A and Alternative B.

An artist's conception of the power plant is shown in Figure S-4. Table S-1 summarizes the features of Alternatives A and B.

TABLE S-1
Features of the Proposed Action Alternatives[1]

Project Element	Alternative A	Alternative B
WELL PADS		
[2]Pad size		
Temperature gradient hole/core hole	18.3 x 30.5 meters (60 x 100 feet)	18.3 x 30.5 meters (60 x 100 feet)
Production/ exploration size	Up to 121.9 x 182.9 meters (400 x 600 feet) per pad or up to about 34 hectares (84 acres) total	121.9 x 182.9 meters (400 x 600 feet) per pad within a 16.2-hectare (40-acre) siting area; up to about 34 hectares (84 acres) total
[2]Sump	3,785,000 liters (1 million gallons)	3,785,000 liters (1 million gallons)
WELLS		
[2]Temperature gradient	4 temperature gradient wells	4 temperature gradient wells
Exploration	Up to 28 exploration wells[3] at 14 locations	Up to 28 exploration[3] wells at 14 of 20 locations
[2]Production	Initially 8 to 10[4] (plus additional wells over the life of the project)	Initially 8 to 10[4] (plus additional wells over the life of the project)
[2]Injection	3 to 5	3 to 5
[2]Testing	Up to 90 days per well	Up to 90 days per well
NEW ACCESS ROADS		
Access to power plant and production well pads (excludes 1.9 kilometers (1.2 miles) of existing Road 9735)	18.3 meters x 3.3 kilometers (60 feet x 2.05) miles = 6 hectares (14.9 acres)	18.3 meters x 3.3 kilometers (60 feet x 2.05 miles) = 6 hectares (14.9 acres)
PIPELINES		
Production and injection pipeline corridors	36.6 meters x 6.1 kilometers (120 feet x 3.8 miles) = 22.37 hectares (55.3 acres)	36.6 meters x 6.1 kilometers (120 feet x 3.8 miles) = 22.37 hectares (55.3 acres)
POWER PLANT SITE		
Siting location	7.5 hectares (18.5 acres) One possible location	7.5 hectares (18.5 acres) site within one of three 12.1-hectare (30-acre) siting areas

TABLE S-1
Features of the Proposed Action Alternatives[1] (Continued)

Project Element	Alternative A	Alternative B
POWER PLANT DESIGN		
[2]Cooling towers	7-cell wet cooling towers	7-cell wet cooling towers
[2]Water use	Local groundwater (up to 3.08 million m^3 [2,500 acre-feet]) and produced geothermal fluid (approximately 1 million m^3 [800 acre-feet])	Local groundwater (up to 3.08 million m^3 [2,500 acre-feet]) and produced geothermal fluid (approximately 1 million m^3 [800 acre-feet])
[2]H_2S removal	Liquid redox, iron catalyst or hydrogen peroxide	Liquid redox, iron catalyst or hydrogen peroxide
TRANSMISSION LINE		
Route	North and adjacent to Road 9735	South of Road 9735
Poles	Wood pole, H-frame	Single wood pole with underbuild
[2]Voltage	115 kV	115 kV
Disturbance	30.5 meters x 13 km (100 feet x 8.2 miles) = 40.8 hectares (101 acres)	22.8 meters x 13 km (75 feet x 8.2 miles) (with additional 50 feet x 8.2 miles feathered)
ROW clearing	30.5-meter (100-foot) width cleared	22.9 meter (75 foot) width cleared 7.6 meters (25 foot) width feathered on both sides
[2]Laydown/construction areas	Existing log landings	Existing log landings

1 Alternative C - No Action: None of these features would be built.
2 Features that are the same in both alternatives.
3 Some of these wells would be converted to production wells.
4 Some of these wells would be converted from exploration wells to production wells.

Alternative A

A map showing the proposed locations of the facilities can be seen in Figure S-5. Key features of Alternative A, as submitted by CEE, include:

- Access roads to the well pads, power plant, pipeline, and transmission line
- A network of steam pipelines constructed above-ground to connect wells to the power plant
- 14 well pad sites, each approximately 2.4 hectares (6 acres) in size, at specific locations
- Geothermal power plant at a specific location, on an approximately 7.3 hectare (18-acre) site
- 13.2-km (8.2-mile) transmission line located along the north side of Road 9735, with a corridor cleared to a width of 30.5 meters (100 feet) and using an H-frame wood pole design

Alternative B

This has been identified by the cooperating agencies as the preferred alternative.

The size, number, and general type of facilities (power plant, wells, well pads, pipelines, access roads, and transmission line), as well as their operation, as proposed in Alternative B are comparable to those described in Alternative A. Alternative B differs in that it includes different siting locations of some components and additional mitigation measures to address issues raised during the scoping and analysis processes. This alternative provides more flexibility in siting to make the most efficient use of the geothermal resource while minimizing environmental effects. Figure S-6 shows the proposed locations of the facilities for Alternative B. The major differences included in Alternative B are:

- There are 20 potential well pad siting areas, of which only 14 could be approved for well pad development. Each potential well pad would be located within its corresponding siting area, which range from 8 to 16 hectares (20 to 40 acres) in size.
- There are 3 potential power plant locations, only 1 of which would be approved. Each potential plant site is located within a 12-hectare (30-acre) siting area.
- The transmission line route from the power plant would be located south of the Alternative A route, and would be an average of 122 to 152 meters (400 to 500 feet) south of Road 9735. The cleared corridor would be 23 hectares (75 feet) wide, and have a feathered edge of an additional 7.6 meters (25 feet)

on each side. Additionally, the transmission line would use a single-pole structure with a lower-voltage underbuild.

Alternative C

Alternative C is the "no action" alternative. Under Alternative C, no facilities would be developed and this geothermal proposal would not be implemented.

AFFECTED ENVIRONMENT

The Newberry Volcano is a broad, gently-sloping, shield-like, forested landform that rises approximately 1,100 meters (3,600 feet) above the surrounding terrain. The proposed Newberry Geothermal Pilot Project is located on the west flank of Newberry Volcano, on Deschutes National Forest land, adjacent to (but not within) the NNVM. The proposed project facilities would be located on undeveloped Federal land used mainly for timber production. Elevation ranges from 1,280 meters (4,200 feet) on the western end of the project area, just west of Highway 97 where the proposed transmission line would connect to an existing Midstate Electric transmission line, to 2,133 meters (7,000 feet) at the northeast portion of the lease area. The northeast portion of the surface occupancy (SO) lease area is currently roadless.

Principal access is provided to the project area by U.S. Highway 97, which runs north/south, and then by County Road 21 or Forest Road 9735. Refer to Figure S-2.

The range of nearly 914 meters (3,000 feet) in elevation and 9.6 km (6 miles) between the eastern and western ends of the project area accounts for differences in weather, vegetation, and wildlife. Soils and rocks in the project area and vicinity are derived from volcanic materials and are generally very permeable. Most rain and snowmelt percolates directly into the ground. There are no surface drainages, permanent waters, or wetlands within the project area. Paulina Creek, a perennial stream eligible for Wild and Scenic River status, flows between (but is not included in) the northern and southern portions of the SO lease areas (Figure S-2). The SO lease area is thought to be located above a fresh groundwater aquifer separated from and underlain by a deep hydrothermal system which this proposed pilot project has been designed to utilize. The exact boundaries and distribution of the underground geothermal resources are not known; however, exploration and information at Newberry indicate that a considerable resource may exist below the surface.

Air quality in the project vicinity is affected by wind-blown dust, pollen, and fires but is in attainment of state and Federal air quality standards. The climate is typical of the semi-arid high desert environment east of the Cascades. Precipitation comes mostly during the winter

and summers tend to be warm and dry. The western end of the project area is lower, warmer, and drier than the eastern end which is comparatively higher, colder, and wetter. This difference is reflected in the vegetation. The western end of the project area is mostly ponderosa pine and lodgepole pine forest, and the eastern and higher elevation end within the SO lease area is lodgepole pine-dominated, with the highest elevation areas of the NSO lease area dominated by lodgepole pine, fir, hemlock, and western white pine. Prolonged drought and beetle infestation have combined with a history of fire suppression to create stands of mature lodgepole pine with abundant standing and down woody material. Much of the timber in the project area has been or will be harvested in the next few years. Wildlife species composition and populations are typical of those found in the pine forests of the High Lava Plains Province of central Oregon. No threatened or endangered species of plants or animals are known to exist within the project area.

The project area is visible from the top of Paulina Peak as well as other sites, including La Pine, Highway 97, and Bend. The vegetation and terrain reduce the visibility or screen some parts of the project area from these viewpoints. Ambient noise levels are relatively low. Recreational use of the project area is low but increasing nearby within the NNVM. Traffic in the project area is currently low.

There are a relatively small number of prehistoric and historic cultural resources sites within the project area; most are either scattered obsidian flakes left from tool-making or artifacts related to the historic logging railroad grade within the area. Aside from wildfires, there are no existing hazards to human health and safety in the project area. There are few existing residences located at the extreme western end of the project area, but none of these will be the site of any proposed project facilities.

ENVIRONMENTAL EFFECTS OF EACH ALTERNATIVE

Potential environmental effects of each alternative were analyzed by resource type (i.e., geology and soils, vegetation, wildlife, etc.), and are briefly described in this section. A comparison of effects of Alternatives A and B are summarized in Table S-2.

Effects Common to Alternatives A and B

Grading and soil disturbance would be necessary for the construction of facilities in Alternative A or B. There are no known geologic features or mineral resources (other than the geothermal resources) that could be affected by the proposal. The facilities would be analyzed and properly designed so that any potential impact from seismic activity would be low.

To avoid adverse impacts to water quality from wastewater produced during drilling or power plant production, the wastewater would be routed to a sump before disposal by injection into the geothermal reservoir. The same would be done for storm water after oil is removed, so that an increase in runoff is not anticipated. Some groundwater would be withdrawn for use during the project.

Over time, a small percentage of fluid loss is expected to occur from the geothermal reservoir. Effects on the hot springs in Newberry Caldera are expected to be long-delayed and slight, if they occur at all, and would likely not be distinguishable from natural fluctuations.

Air pollution control measures would be built into the project to reduce potential air quality impacts. However, it is expected that hydrogen sulfide may be smelled in the area at times, and that a steam cloud will be visible at times. Visual impact of the facility itself would be minimized through effective site planning. The facilities could be partially visible from a few local high points, such as Paulina Peak and the Rim Trail.

In general, noise levels from the proposed complex of power producing equipment would be expected to be low at all receptor locations and also at a distance of 0.5 mile (0.8 km) and is expected to be in compliance with both Federal and state regulations. Impacts on people and wildlife from noise are anticipated to be minor.

The proposed project would bring industrial development to an area of Forest Service land currently used for forestry, fuelwood gathering, and dispersed recreation. It would bring access roads and facilities to a portion of the North Paulina Roadless Area. This land use, however, would be consistent with existing land use plans and policies. Changes to recreation would also be consistent with designations assigned to the area.

Local community traffic is expected to increase only slightly, with the largest amount to occur during the construction phase. New road construction and upgrading of existing roads would occur.

During project design, an attempt would be made to locate facilities in previously disturbed areas. Some lodgepole pine-dominated communities that are common in this region will be impacted as some vegetation will be removed. This removal would also constitute a minor loss of wildlife habitat. No threatened or endangered plants or animals are known to occur in the project area and no adverse effects on such species are expected.

Activities associated with transmission lines have the potential to impact existing cultural resources. Careful placement would avoid impacts on significant sites.

Probabilities of accidents and fires have been calculated during a 50-year project life. The presence of personnel in the area on a 24-hour basis would be a benefit in reporting and extinguishing fires that may start in the project area or on adjacent National Forest lands.

Likely socioeconomic impacts include a small increase in jobs (about 25 permanent), and a slight impact on local schools. In addition, Deschutes County will receive about $1 million in property taxes and about $250,000 in federal royalties.

Environmental Effects of Alternative C

Under Alternative C, the effects associated with construction and operation of the proposed project would not occur, and the viability of the geothermal resource at Newberry would not be tested with this project. However, other proposals in the future could be submitted and considered.

Areas of Controversy

No evidence has emerged during the preparation of this Draft EIS to suggest that the proposed action is particularly controversial. All issues raised have been addressed in this analysis.

Issues to be Resolved

No unresolved environmental issues pertaining to the proposed action have been identified. The findings and data collection during the exploration stage will shape plans for construction and utilization more specifically and would verify or modify assumptions about the geothermal resource used for this analysis. If it is found that assumptions about the resources, types of facilities needed, or environmental effects differ significantly from information used in this analysis, the project or elements of the project will be re-evaluated.

Other Considerations

BPA's Resource Programs EIS showed that geothermal resources are believed to have a high potential for being a cost-effective and renewable energy source. The Newberry Geothermal Pilot Project includes features that would minimize impacts to natural resources. The proposal would have some short-term impacts during construction, but would be unlikely to damage the long-term productivity of the environment.

Project construction would require commitment of building materials. Materials that could be reused or recycled would be salvaged during the decommissioning stage. Construction and

TABLE S-2
Comparison of Effects of Action Alternatives (Continued)

Discipline	Type and Magnitude of Alternative A Impacts	Type and Magnitude of Alternative B Impacts
Visual Resources	Except for the power plant steam plume and well venting, facilities will not be visible from any key observation point (KOP), except for Paulina Peak and the Rim Trail. Plume will draw visual attention from Paulina Peak and Rim Trail. From more distant KOPs, plume will be visually subordinate to surrounding landscape and not generally noticed.	Steam plume, well venting, pads south of Road 21 effects similar. Power Plant Site 2 is slightly more visible from Paulina Peak (KOP 3) due to lack of visual screening in logged areas; this site is 0.8 km farther from the KOP, which compensates some for lack of screening. Power Plant Site 3 is less visible from Paulina Peak than Plant Sites 1 or 2.
	Well pads located south of Paulina Creek would be partially visible from Road 21.	The six additional well pads would have visual impacts similar to the 14 in Alternative A.
	Transmission line would be visible in clearcuts along Road 9735 and briefly from Highway 97. Night glow of power plant would be visible from Paulina Peak and its access road; dim night glow may be visible from more distant KOPs.	Transmission line corridor will not be as visible from Forest Road 9735, reducing potential impacts to a road corridor that may receive increased use in the future. Night glow would be less than Alternative A.
Noise	Impacts from slightly elevated noise levels and occasional sounds associated with drilling.	Lower power plant noise at potential noise receptors owing to more distant location of Plant Sites 2 and 3. Other differences imperceptible.
Land Use	Reduction of North Paulina Roadless Area by 6 percent.	Same as A, except that Plant Site 3 would also be in roadless area.
	Removal of 131.8 hectares (325.7 acres) from the timber base in the Project Area.	Removal of a slightly greater or lesser area than Alternative A from the timber base depending on plant site and well pad selection.
Recreation	Changes to recreation experience to hunting and snowmobiling would be consistent with the Roaded Modified or Semi-Primitive Motorized (winter only) ROS designations assigned to the Project Area. Recreation experience could be affected at times when elements of the proposed project would be (infrequently) seen, heard, and/or smelled.	Same as A, except that Plant Site 3 would intrude into the currently roadless area.

TABLE S-2
Comparison of Effects of Action Alternatives (Continued)

Discipline	Type and Magnitude of Alternative A Impacts	Type and Magnitude of Alternative B Impacts
Traffic and Transportation	Rebuild main entrance to project area by following Forest Road 9735 to Spur 500, connecting Spur 500 to Spur 600 along proposed transmission line corridor; requiring 1.6 km (1 mi) of new road along transmission line, extensive rebuilding of Spur 600; widening of Spur 500; new roads for well pads, access road along entire length of transmission line provided by Forest Road 9735.	During development, Spur Roads 500 and 600 would be resurfaced and become main access road to Plant Sites 1 and 2 requiring 1.6 km (1 mile) of new road along the transmission line and rebuilding of Spur 600. Plant Site 3 would require about 3 km (2 miles) of new road construction along exploration roads. Additional length of road may be required if more distant well pads are chosen. Separate transmission corridor from Forest Road 9735 would be constructed, possibly needing additional access from Road 9735 at intervals along eastern portion of line via short spurs across existing logging units.
Vegetation	Removal of 7.5 hectares (18.5 acres) of lodgepole pine regeneration habitat at Plant Site 1.	Plant Site 1 is same as Alternative A. Removal of 7.5 hectares (18.5 acres) of lodgepole pine and lodgepole pine regeneration habitat for Plant Site 2. Removal of 7.5 hectares (18.5 acres) of lodgepole pine for Plant Site 3.
	For gathering system, removal of 22.7 hectares (56 acres) of vegetation, including 4.4 hectares (10.9 acres) of lodgepole-mixed conifer, 2 hectares (4.8 acres) of lodgepole/clearcut, 16.1 hectares (39.8 acres) of lodgepole, and 0.13 hectares (0.34 acres) of mixed conifer.	
	For access roads, loss of lodgepole-dominated areas with portions of open ponderosa pine and mixed conifer habitats.	For access roads, removal of potentially slightly more vegetated area for access to the transmission line corridor if existing roads are not present.

TABLE S-2
Comparison of Effects of Action Alternatives (Continued)

Discipline	Type and Magnitude of Alternative A Impacts	Type and Magnitude of Alternative B Impacts
	For the transmission line area, removal of 40.8 hectares (118.1 acres) of vegetation, including 13.8 hectares (34 acres) of mixed conifer habitat, 1.2 hectare (3 acres) of lodgepole pine, 20 hectares (49.5 acres) of open ponderosa pine, 0.8 hectare (2 acres) of ponderosa pine seedlings 3.8 hectares (9.5 acres of lodgepole pine regeneration, and 1.2 hectare (3 acres) of mixed conifer partial cut habitat.	For transmission line, removal of 28 hectares (69.5 acres) of vegetation, including 1.2 hectare (3 acres) of lodgepole pine seedling regeneration, 0.2 hectare (0.5 acre) of lodgepole pine, 8.1 hectares (20 acres) of mixed conifer, 13.7 hectares (34 acres) of open ponderosa pine, 3.2 hectares (8 acres) of lodgepole pine regeneration and 1.6 hectare (4 acres) of mixed conifer partial cut habitats. Partial removal (feathering) would include approximately 0.45 hectare (1.1 acre) of lodgepole pine seedling regeneration, 0.08 hectare (0.2 acre) of lodgepole pine, 2.5 hectares (6 acres) of mixed conifer, 4.7 hectares (11.8) acres of open ponderosa, 1.1 hectare (2.8 acres) of lodgepole pine regeneration and 0.53 hectare (1.3 acres) of mixed conifer partial cut habitats.
	For well pads, removal of 34 hectares (84 acres) of habitat, including 3.7 hectares (9.2 acres) of lodgepole/mixed conifer, 1.4 hectares (3.5 acres) of lodgepole/clearcut, 24.6 hectares (60.8 acres) of lodgepole, 0.2 hectare (0.4 acre) of mixed conifer, and 4.1 hectares (10.1 acres) of clearcut.	Removal at well pads could be of different vegetation composition, depending on pad sites chosen. Some shrub and mixed conifer habitat could be avoided.
	Minimal effects of air pollutants on vegetation.	Same as A. Better avoidance of sensitive areas and mixed conifer vegetation through project design and siting flexibility.

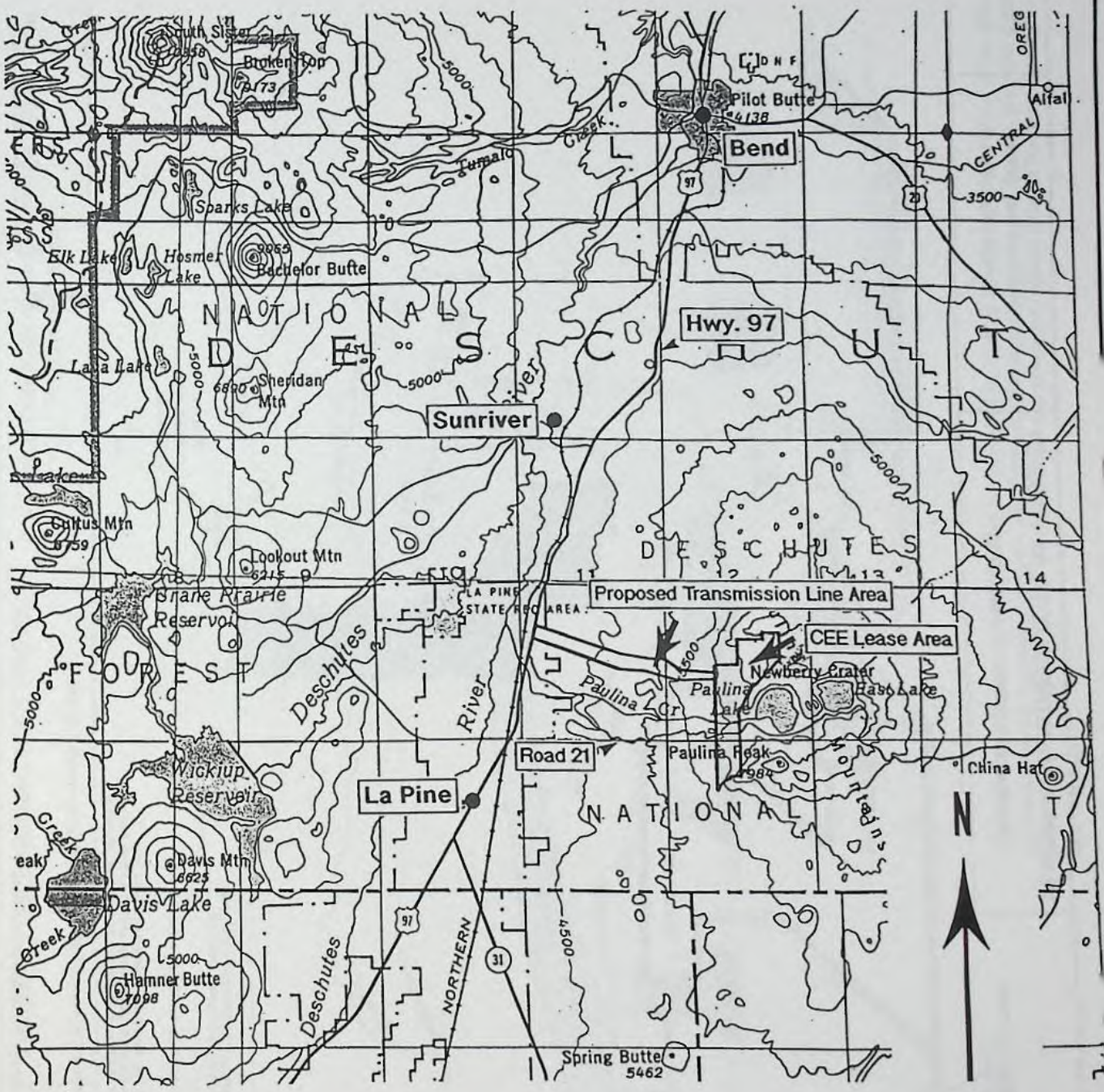
TABLE S-2
Comparison of Effects of Action Alternatives (Continued)

Discipline	Type and Magnitude of Alternative A Impacts	Type and Magnitude of Alternative B Impacts
Wildlife	Total 131.8 hectares (325.7 acres) of direct habitat loss or modification due to facility placement. (Well pads, plant, and roads equal habitat loss. Transmission line and pipeline equal habitat modification.)	Habitat losses and modification similar to A; but more or less could occur in mixed conifer type under this alternative, depending on well pads chosen. Impacts from development of well pad O-14 could result in an additional loss of up to 2.4 hectares (1 acre) of deer/elk high use area, not including access road. Clearing width of transmission line is 7.6 meters (25 feet) narrower than Alternative A. Loss of approximately 7.5 hectares (18.5 acres) potentially suitable habitat for black-backed woodpecker (MIS) at Plant Sites 2 and 3.
Cultural Resources	Known resources can be avoided.	Same as A.
Human Health and Safety	Probability of accidents during transport of hazardous materials during exploration estimated at 0.238 percent. During utilization over 50-year project life, approximately 5 accidents during transportation of hazardous materials estimated. Probability of project personnel-caused fires over 50-year life of project conservatively estimated at 8; this would be offset by benefits of personnel present 24 hours a day to spot, report, and assist in extinguishing fires.	Same as A, except slightly less potential for public EMF exposure along western end of transmission line.

TABLE S-2
Comparison of Effects of Action Alternatives (Continued)

Discipline	Type and Magnitude of Alternative A Impacts	Type and Magnitude of Alternative B Impacts
Economic and Social Characteristics	Peak population increase of 447 persons during height of construction, and 50 persons during utilization. Construction jobs at peak would be 227 (60 local hires), during utilization 25 permanent jobs (12 local hires) would be created. Up to 60 additional students would be in Bend/La Pine School District during peak of construction. Royalties (approximately $240,000) and property taxes (approximately $1.2 million) would be raised.	Same as A.

NEWBERRY GEOTHERMAL PILOT PROJECT Deschutes National Forest, Oregon	Vicinity Map and Proposed Project Area	Figure S-1



Note: The boundaries of the Lease Area and Transmission Line Area are approximate in nature.

Scale

0 1 2 3 km

0 1 2 miles

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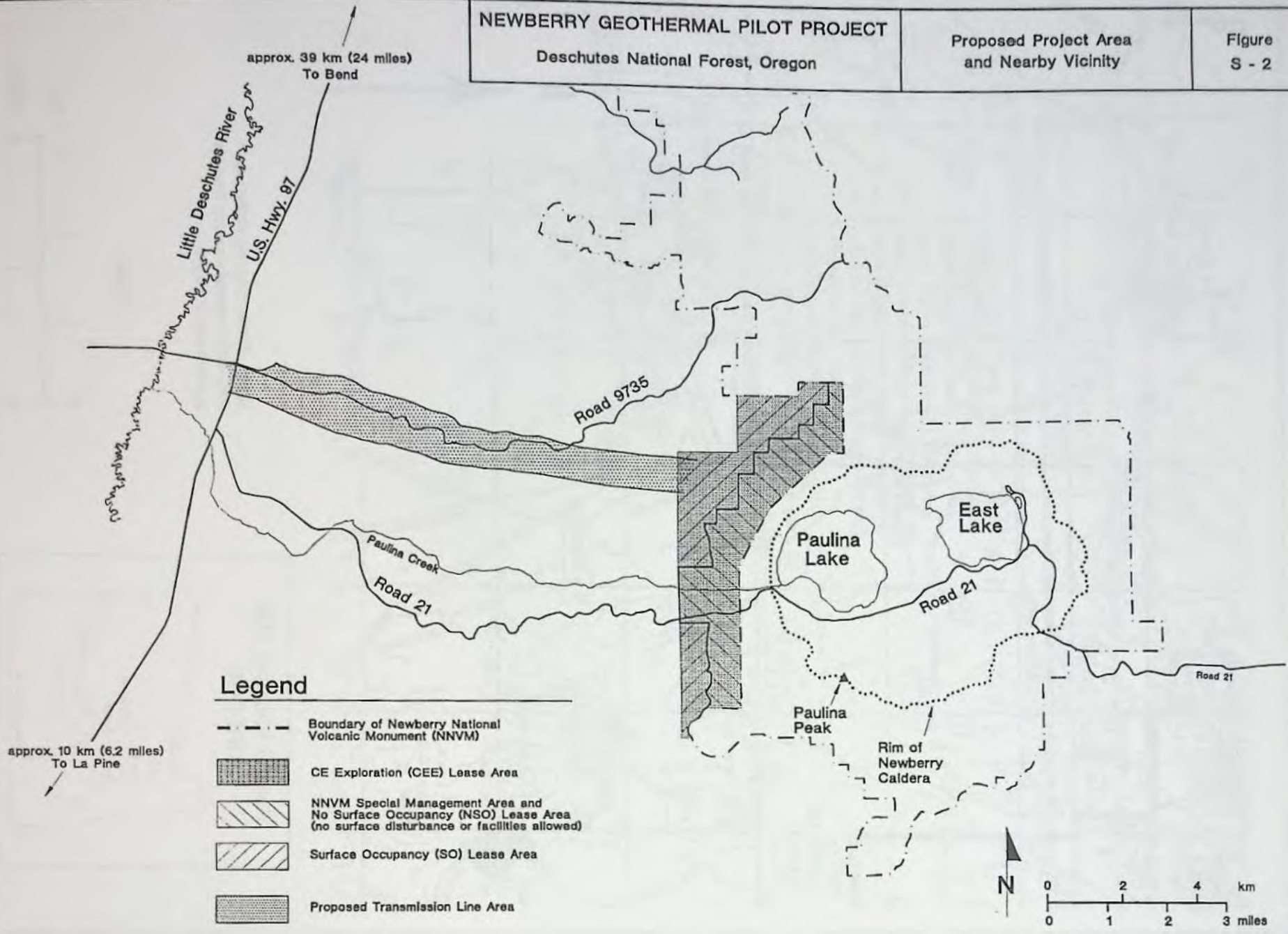
NEWBERRY GEOTHERMAL PILOT PROJECT

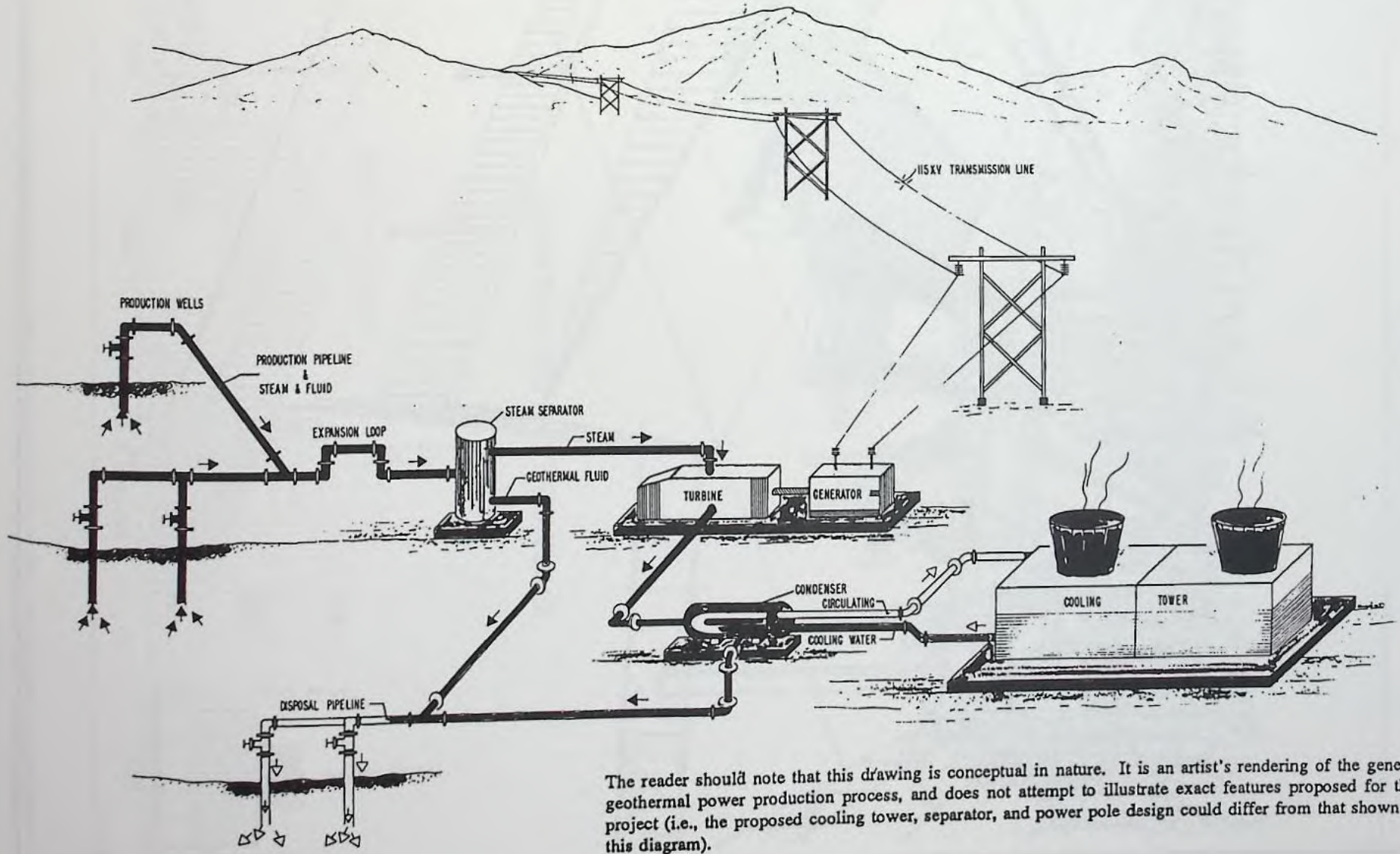
Deschutes National Forest, Oregon

Proposed Project Area and Nearby Vicinity

Figure S - 2



NEWBERRY GEOTHERMAL PILOT PROJECT Deschutes National Forest, Oregon	Conceptual Illustration of the Geothermal Power Production Process	Figure S-3



The reader should note that this drawing is conceptual in nature. It is an artist's rendering of the general geothermal power production process, and does not attempt to illustrate exact features proposed for this project (i.e., the proposed cooling tower, separator, and power pole design could differ from that shown in this diagram).

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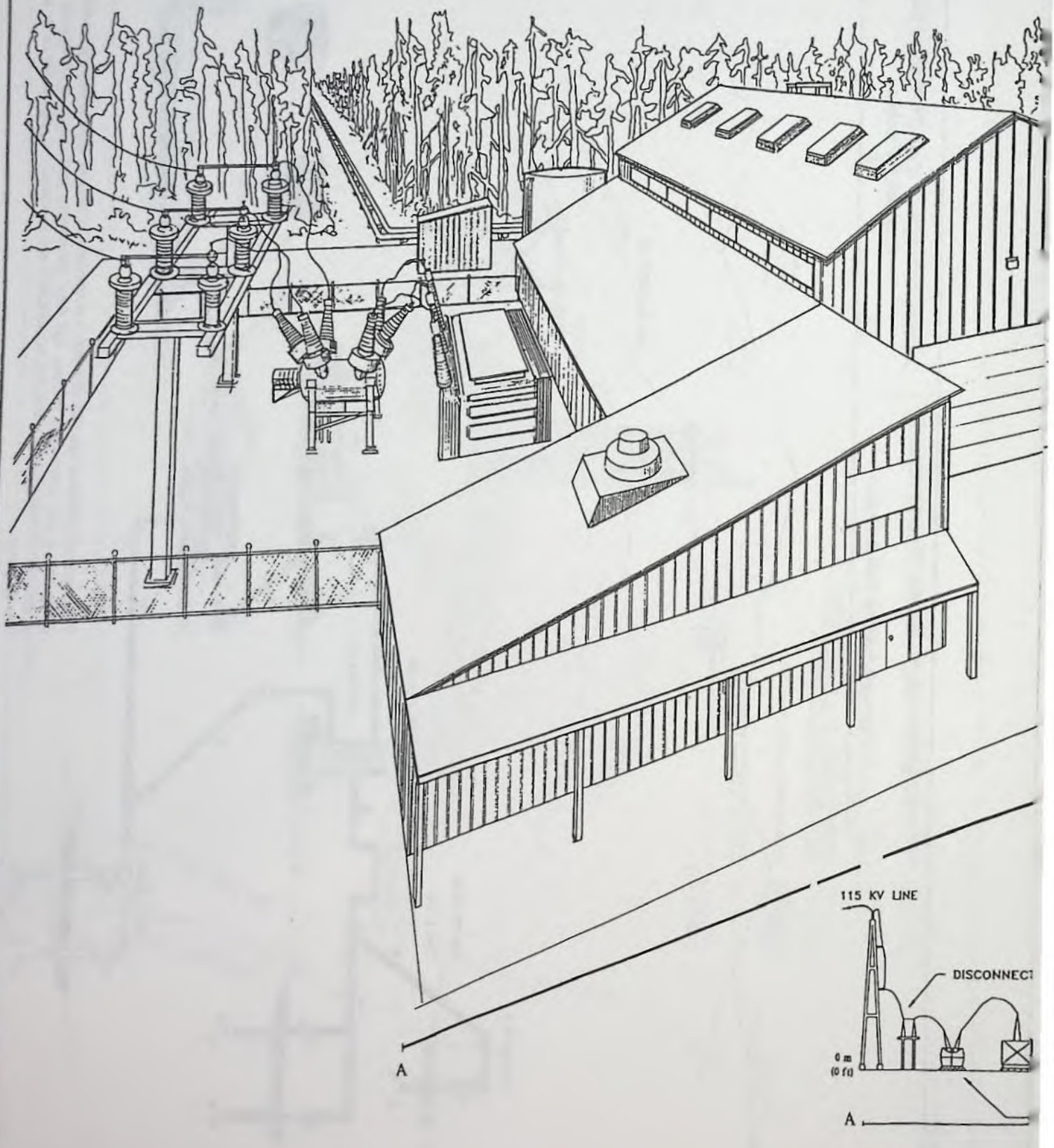
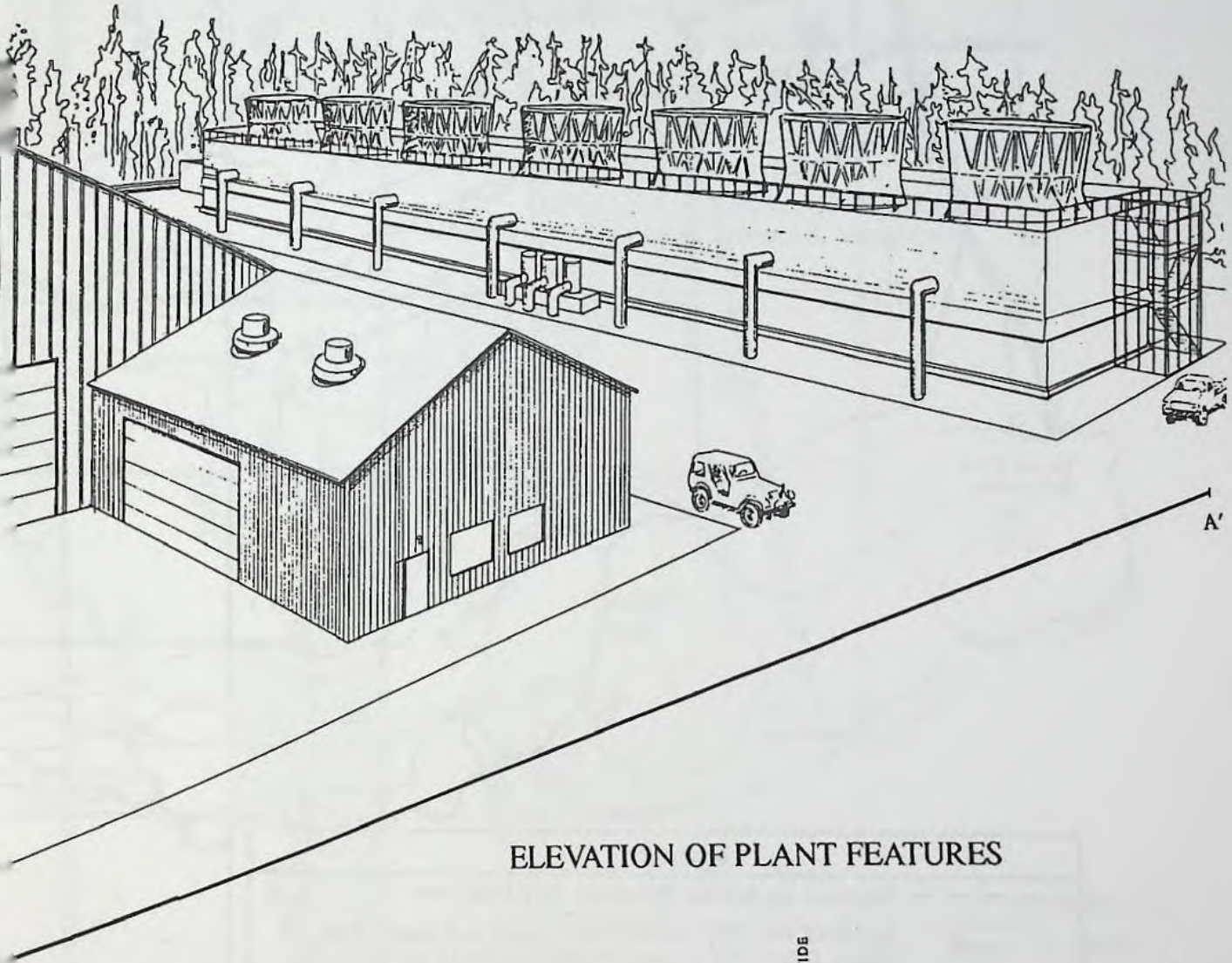
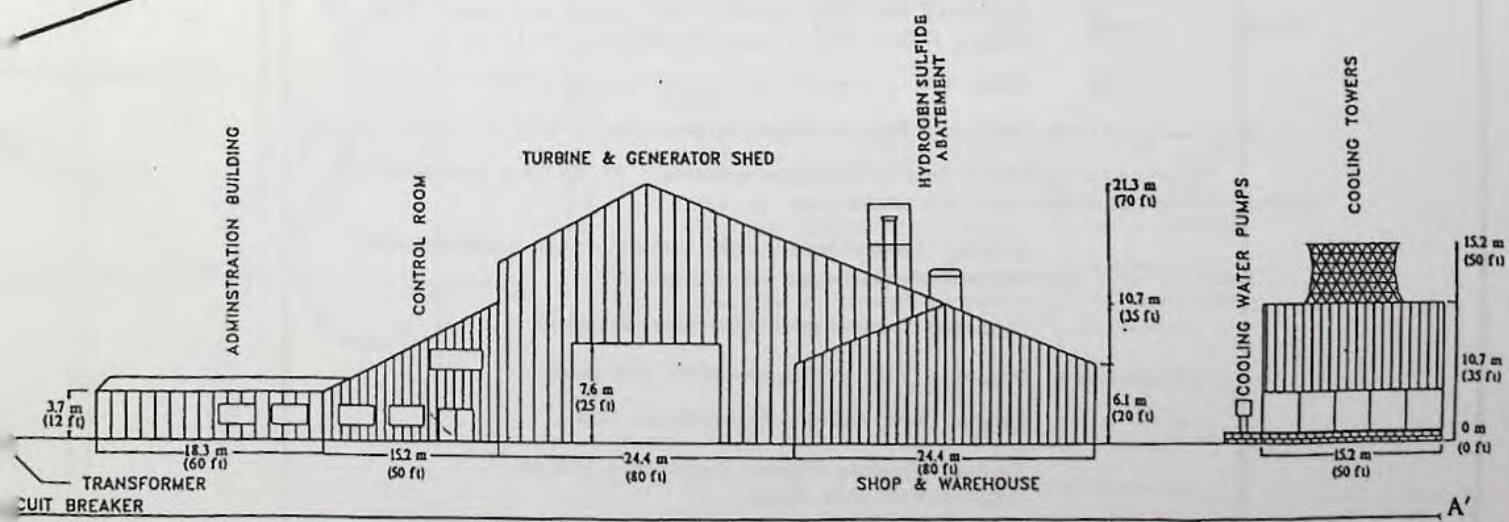


GEOTHERMAL PILOT PROJECT utes National Forest, Oregon	Artist Conception of the Power Plant Site and Elevation of Plant Features	Figure S-4



ELEVATION OF PLANT FEATURES



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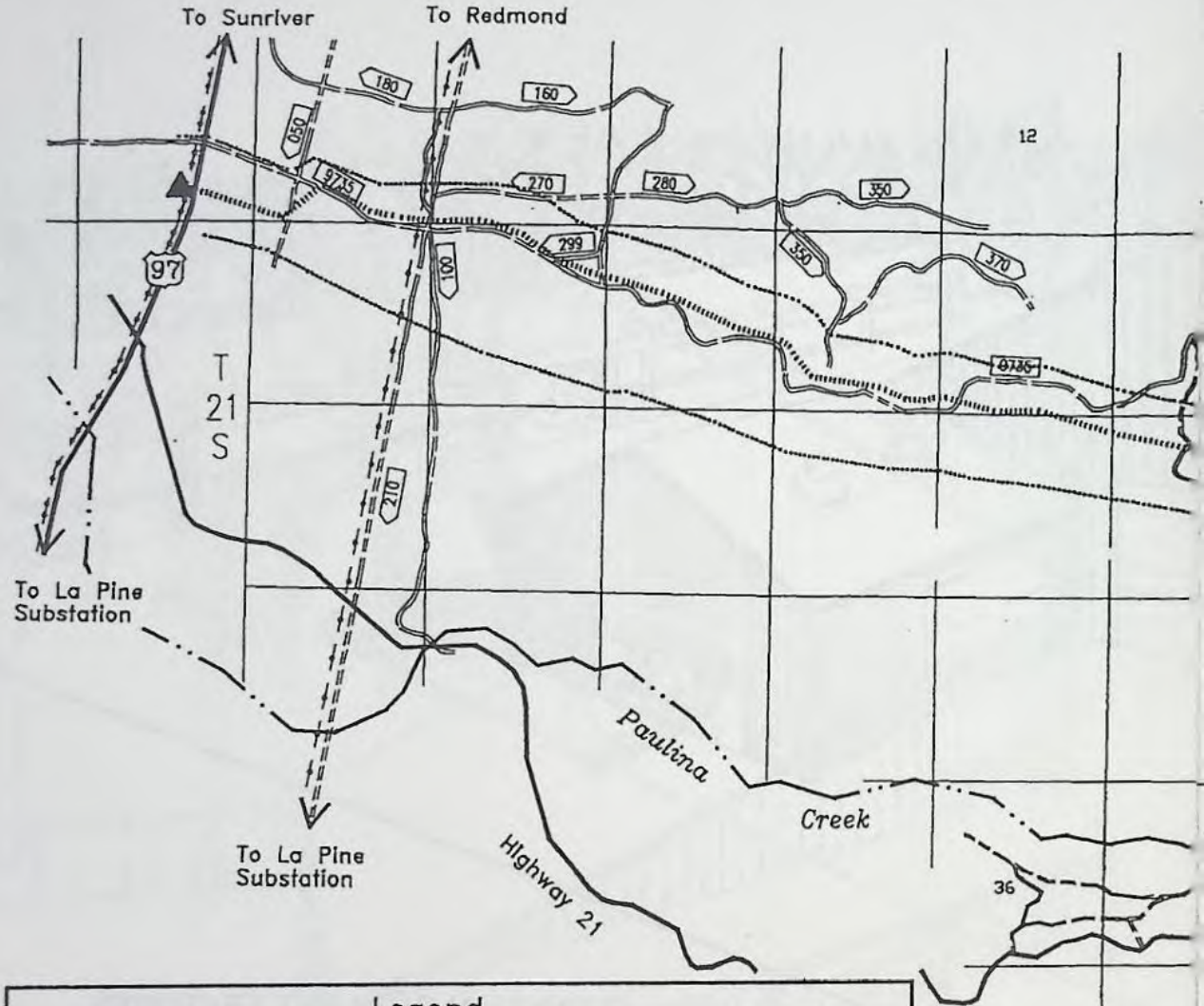
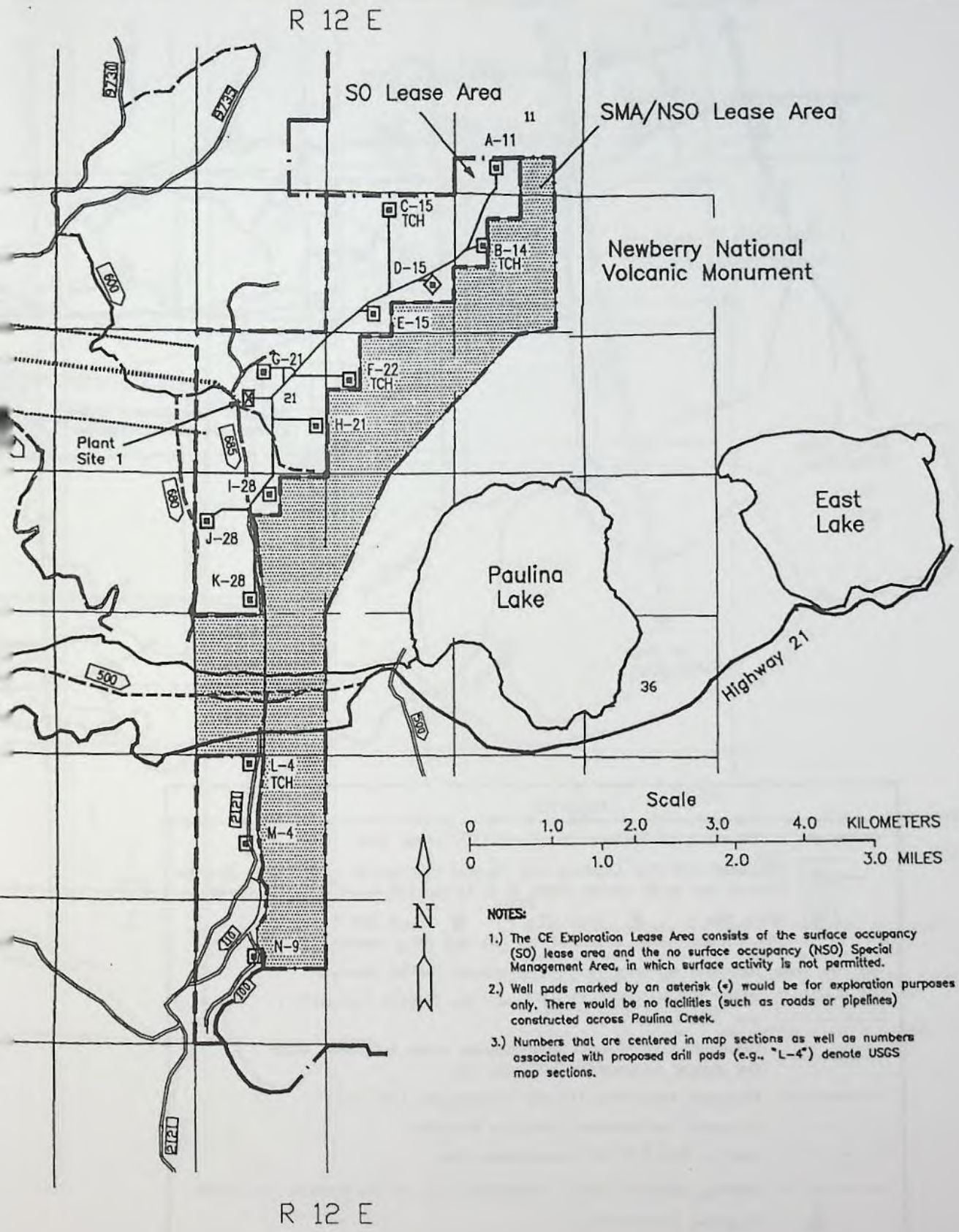


Legend

- Boundary of Surface Occupancy (SO) Lease Area
- Proposed Drill Pad Location and Pipeline and Access Road Routes (Drill Pad = approximately 2.4 ha [6 ac])
- Plant Site 1 (would occupy 7.5 ha [18.5 ac])
- Newberry National Volcanic Monument (NNVM) Boundary
- NNVM Special Management Area (No Surface Occupancy) and NSO Lease Area
- Existing Access Roads (only includes roads mentioned within the project proposal; see Section 2)
- Proposed Transmission Line Area Boundary
- Proposed 115-kV Transmission Line Route
- Existing BPA 230-kV Transmission Line
- Existing Midstate Electric Cooperative 115-kV Transmission Line Route
- Proposed Switch Station
- TCH — Temperature Core Hole

GEOTHERMAL PILOT PROJECT utes National Forest, Oregon	Alternative A, Newberry Geothermal Pilot Project	Figure S-5



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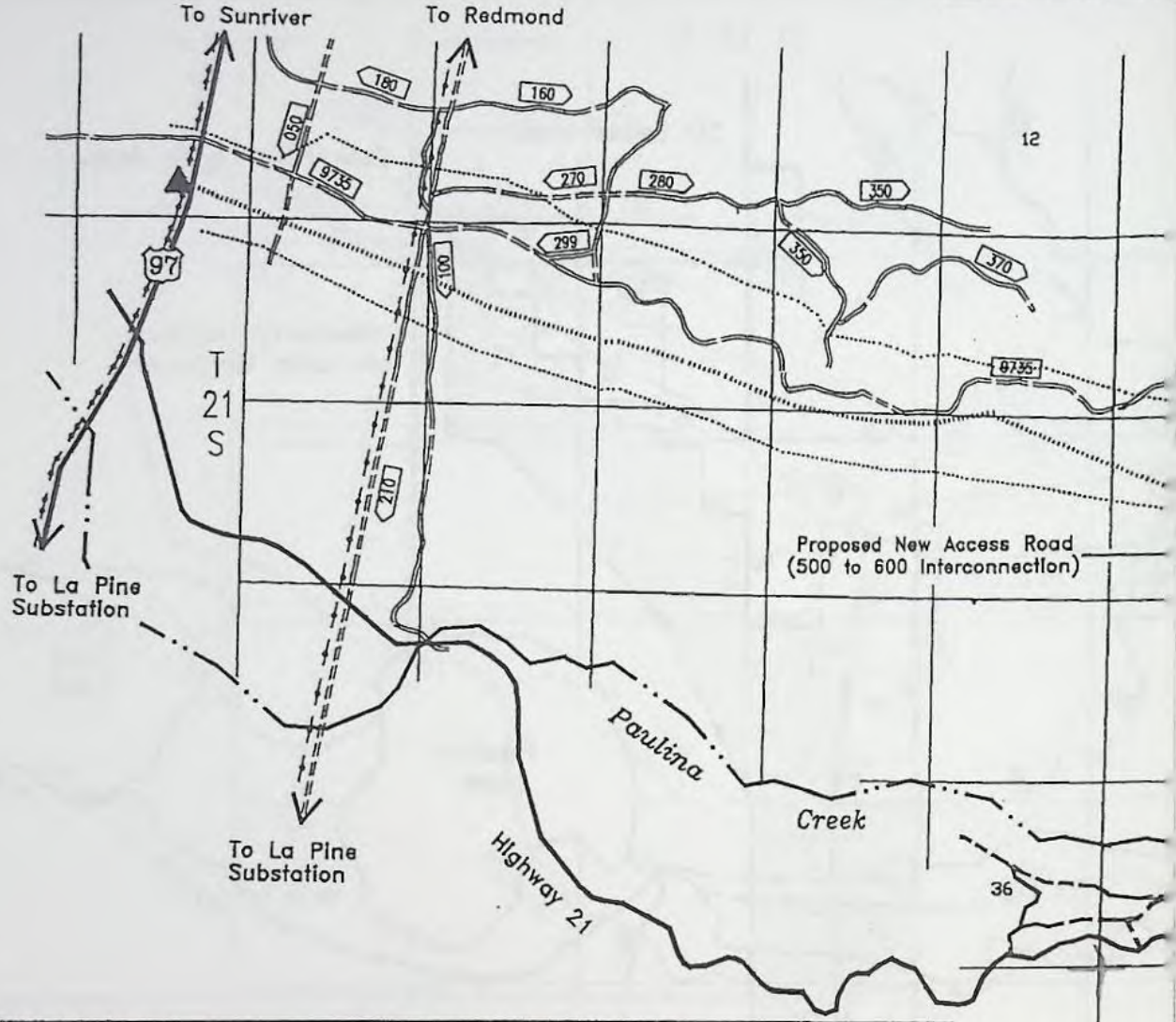


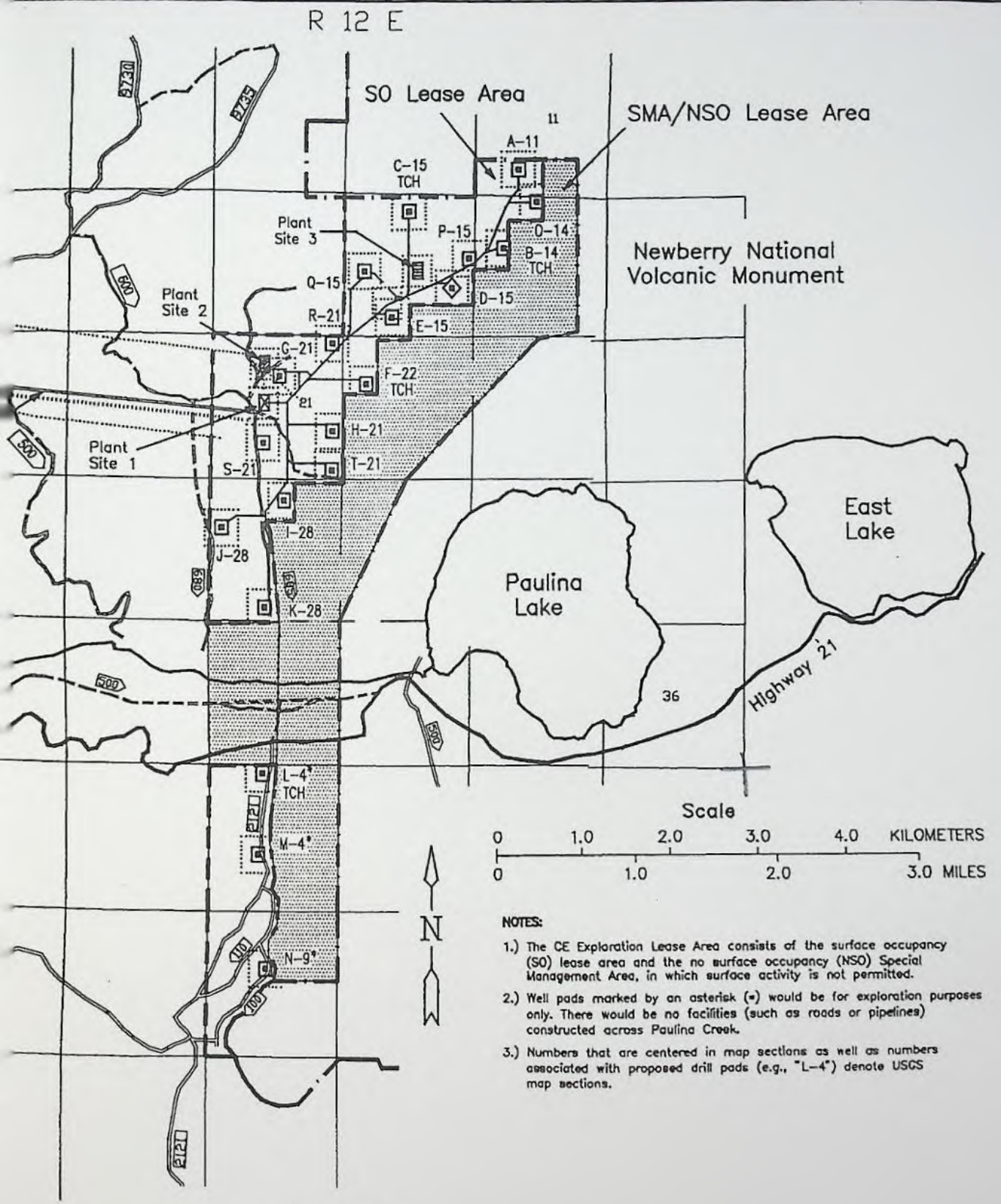
Legend

- Boundary of Surface Occupancy (SO) Lease Area
- Proposed Drill Pad Location and Pipeline and Access Road Routes (2.4-ha [6-ac] drill pads shown within 8 to 16-ha [20 to 40-ac] siting area)
- Plant Site 1 Plant Site 2 Plant Site 3 (Plant sites shown within 12-ha [30-ac] siting areas)
- Newberry National Volcanic Monument (NNVM) Boundary
- NNVM Special Management Area (No Surface Occupancy) and NSO Lease Area
- Existing Access Roads (only includes roads mentioned within the project proposed; see Section 2)
- Proposed Alternative 115-kV Transmission Line Route
- Proposed Transmission Line Area Boundary
- Existing BPA 230-kV Transmission Line
- Existing Midstate Electric Cooperative 115-kV Transmission Line Route
- Proposed Switch Station
- TCH Temperature Core Hole

GEOTHERMAL PILOT PROJECT
hutes National Forest, Oregon

Alternative B, Newberry Geothermal Pilot Project

Figure S-6



NOTES:

1.) The CE Exploration Lease Area consists of the surface occupancy (SO) lease area and the no surface occupancy (NSO) Special Management Area, in which surface activity is not permitted.

2.) Well pads marked by an asterisk (*) would be for exploration purposes only. There would be no facilities (such as roads or pipelines) constructed across Paulina Creek.

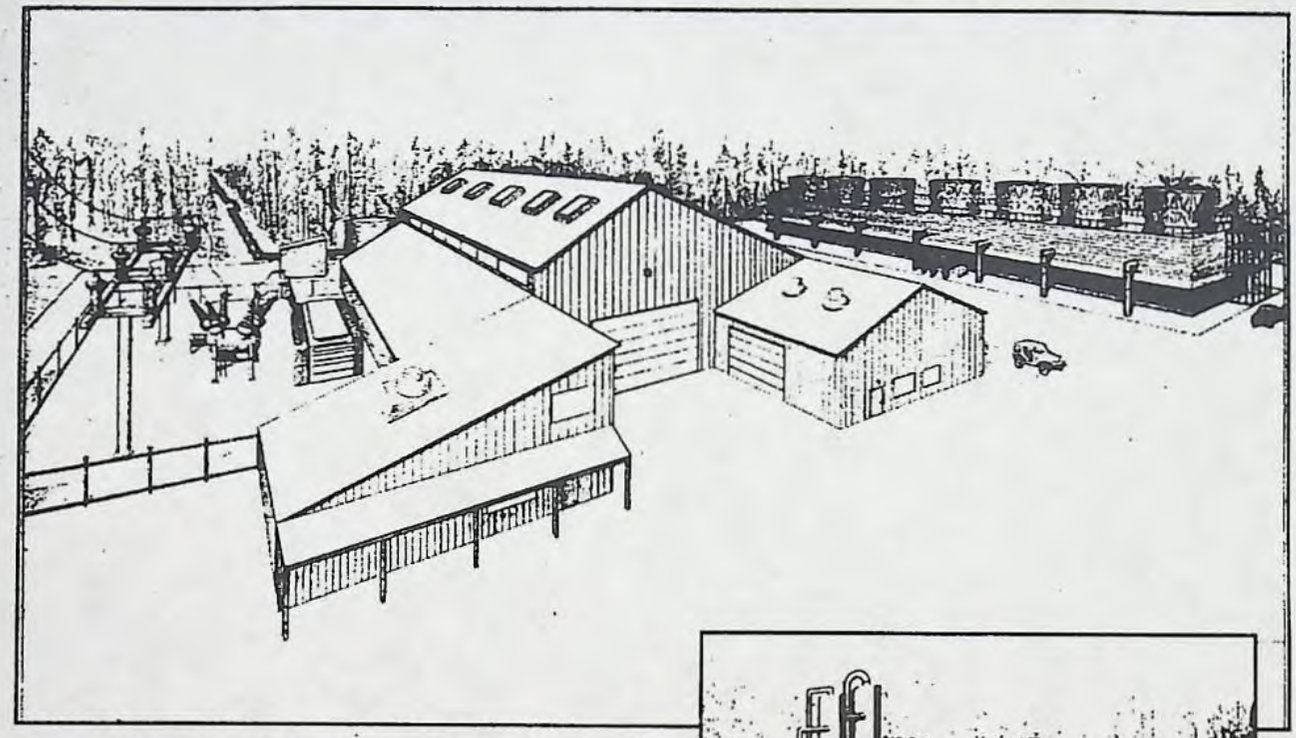
3.) Numbers that are centered in map sections as well as numbers associated with proposed drill pads (e.g., "L-4*") denote USGS map sections.

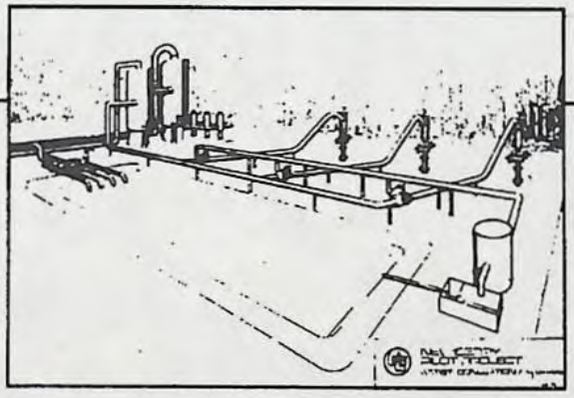
ATTACHMENT 3

DOE/EIS - 0207
June 1994

Newberry Geothermal Pilot Project

Final Environmental Impact Statement





CE Exploration Company of Portland, Oregon has submitted a proposal to build and operate a 33-megawatt geothermal power plant in the Deschutes National Forest in Central Oregon. This is the draft version of the environmental analysis of the proposed project, prepared by the U.S. Forest Service, the U.S. Bureau of Land Management, and Bonneville Power Administration.

U.S. Forest Service

Bonneville
POWER ADMINISTRATION

U.S. Bureau of Land Management

In the project area, frost action is limited and confined to the growth of needle ice in the upper few inches of bare soil. During thaw, the collapse of the needle ice enhances surface soil creep and does not present a risk to either structures or sumps.

3.2.4. Mineral Resources

The geothermal resource at Newberry Volcano appears to be the only significant mineral resource in the project area. There are no known commercial deposits of precious, strategic, or base metals in the project region. However, cinders and lava continue to be quarried from the flanks of Newberry Volcano for use as road construction material.

3.3. WATER RESOURCES

The study area for this section is defined as an area 64 km (40 miles) wide (east/west) by 80 km (50 miles) long (north/south), and it includes portions of Deschutes, Crook, Lake, and Klamath Counties.

In 1991, the USGS began a baseline hydrologic and water-quality data collection program for BPA, BLM, and the U.S. Forest Service in order to help identify and assess the potential impacts of proposed geothermal development (Morgan 1991a, 1991b, and 1992). Types of data collected include groundwater levels, lake levels, streamflow, water quality, and meteorological measurements. Data were collected from June 1991 through September 1993. If development were to be approved, long-term monitoring would continue in order to detect physical and chemical changes in the hydrologic system in Newberry Caldera that could be caused by exploration, development, or utilization of geothermal resources.

The following description is primarily based on a recent report written by Dames & Moore (1994). The 1994 Dames & Moore report includes a review of all published water resources and water quality data. A primary source was the STORET data management system administered by EPA and the Oregon Department of Environmental Quality (DEQ). Data obtained by a number of state and Federal agencies are stored in the STORET system. The agencies include DEQ, EPA, Oregon Department of Water Resources (WRD), U.S. Forest Service, USGS, and the U.S. Bureau of Reclamation. STORET has data on Paulina Creek, Little Deschutes River, Deschutes River, Tumalo Creek, Paulina Lake, East Lake, Wickiup Reservoir, and water wells in the following areas: Newberry Crater, LaPine subbasin, Deschutes River watershed, and Tumalo Creek watershed.

Published data contained in past USGS hydrologic studies of Newberry Caldera were also reviewed (Ingebritsen 1986; Phillips 1968; Sammel 1983; Sammel 1988). The USGS Newberry Caldera data includes information on Paulina Lake, East Lake, caldera groundwater, Paulina Lake thermal springs, East Lake thermal springs, caldera geothermal steam, and Paulina Creek.

3.3.1. Studies Performed

Two studies have been performed to characterize the hydrology in the vicinity of Newberry Volcano. The first study — begun in 1991 by the USGS at the request of BPA, BLM, and the U.S. Forest Service — collected hydrologic, water-quality, and meteorologic data at approximately 21 sites (sampling points were added and dropped as the study progressed). The purpose of the study was to provide baseline data for identifying and assessing impacts of geothermal development. The study was limited to data collection, which is ongoing, with only limited interpretation of the data. Data collected will be published in a USGS open-file report in mid-1994 (Crumrine and Morgan 1994). The monitoring program is summarized below.

A second study was done by Dames & Moore of Portland, Oregon, in 1993. This study collected and interpreted available hydrogeologic data for the Newberry area, but generated no new data. A Hydrology Baseline Report was prepared, which included:

- A compilation of existing data
- Collation of pertinent publicly available data interpretations
- Results of field review and ground truthing of existing data
- Identification of key environmental issues
- Tables and maps of reviewed geological and hydrological information
- Data analysis and interpretation, including both existing and potential for interaction between the cold groundwater and geothermal systems resulting from geothermal development, and the potential impact of interaction on environmental issues

3.3.2. Geological Survey Hydrologic Monitoring Program

After performing a literature search and other preliminary investigations, the USGS initially selected 17 monitoring sites. These were later expanded to 21 sites, listed in Table 3.3-1. These sites include: (1) 12 wells, (2) two piezometers in hot springs areas, (3) lake gauges on East and Paulina Lakes, (4) water-quality vertical profiles and water-quality sampling sites on the lakes, (5) a streamflow data site on Paulina Creek, and (6) a streamflow measurement and sampling site on Paulina Creek 13 km (8 miles) downstream from the lake. The locations of monitoring sites within Newberry Caldera are shown in Figure 3.3-1.

Data collection was based on the "Guidelines for Acquiring Environmental Baseline Data on Federal Geothermal Leases" and USGS recommendations. Over 50 water quality parameters were measured, including water temperature, pH, specific conductance, dissolved oxygen, common anions and cations, nutrients, trace elements, radio-chemicals, and isotopes. These parameters are listed in Table 3.3-1. Meteorological data were also collected, including wind velocity, air temperature, humidity, solar radiation, and precipitation.

If the proposed geothermal project were to be approved, hydrologic monitoring would continue.

3.3.3. Regional Hydrology

The project vicinity falls within two major watersheds, the Deschutes Basin and the Fort Rock Basin (Figure 3.3-2). A watershed is generally defined as the area which receives surface runoff from snow and rain and drains to a particular watercourse. The Deschutes River and a major tributary, the Little Deschutes River, drain the Deschutes Basin and flow to the Columbia River, 225 km (140 miles) to the north. Therefore, the Little Deschutes River is within the Deschutes River watershed, and the Deschutes River is within the Columbia River watershed. There are no major surface streams and no surface outlet in the Fort Rock Basin. The Fort Rock Basin is a closed watershed.

Soils and rocks in both the Deschutes and Fort Rock basins are very permeable, and most rain or snowmelt percolates directly into the ground. Groundwater in the upper Deschutes Basin, south of Bend, moves primarily northward within permeable volcanic rocks and unconsolidated silt, sand, and gravel deposited during the past 2 million years. It is estimated that about 135 million cubic meters (1.1 million acre-feet) of water recharges the upper Deschutes Basin groundwater basin annually, coming primarily from the eastern slope of the Cascade Range (King 1991). The Deschutes Formation north of Bend is the principal aquifer in the Deschutes Basin, although groundwater also occurs in other smaller geologic units. These units are being evaluated in a current USGS study. Groundwater flow in the region is generally toward the north.

Table 3.3-1 Newberry Hydrologic Monitoring Sites and Sampling Program - 1994

Monitoring Site Name	Location	Monitoring Frequency[1] Chemistry[3]	Stage/ Water Level	Temperature/ Conductance	Climate[2]
Hot Springs					
East Lake Hot Spring (P-4)	21S/13E-29cdd2	S	S	S	
Paulina Lake Hot Springs	21S/12E-26aab1	S	S	S	
Wells					
Cinder Hill CG No. 7	21S/13E-29aac		SM,I	SM,I	
Geo-Newberry	21S/13E-29dca1	A	SM,I	SM,I	
Hot Springs CG No. 1	21S/13E-32abb	A	SM,I	A	
East Lake CG No. 1	21S/13E-32bbb		SM,I	SM,I	
Sandia	21S/13E-31cdb	S	C	S	
Little Crater CG No. 3	21S/12E-36baa	S	C	S	
Newberry Group Site CG	21S/12E-35dcb	A	SM,I	A	
Paulina Guard Station	21S/12e-34acc	A	SM,I	A	
Paulina Lake Lodge No. 1	21S/12E-34acb1	A	SM,I	A	
LaPine High School	22S/10E-10da	B	I	B	
China Hat Guard Station	22S/14E-22bbc	B	I	B	
Prairie Campground	21S/11E-28cba	B	I	B	
Streams					
Paulina Cr. nr outlet	21S/12E-34acb	S	C	C	
Paulina Cr. nr bridge	21S/11E-28bca	S	S,I	S,I	
Lakes					
Paulina Lake	PL-11-30	S		S	
	PL-11-60	S		S	
East Lake	EL-08-30	S		S	
	EL-08-60	S		S	
Other					
Paulina Lake Weather Station	21S/12E-34acb				C

[1]Explanation of frequency codes:

A	Annually
B	Biannually
C	Continuously
I	Intermittently
M	Monthly
Q	Quarterly
SM	Semimonthly
S	Semiannually

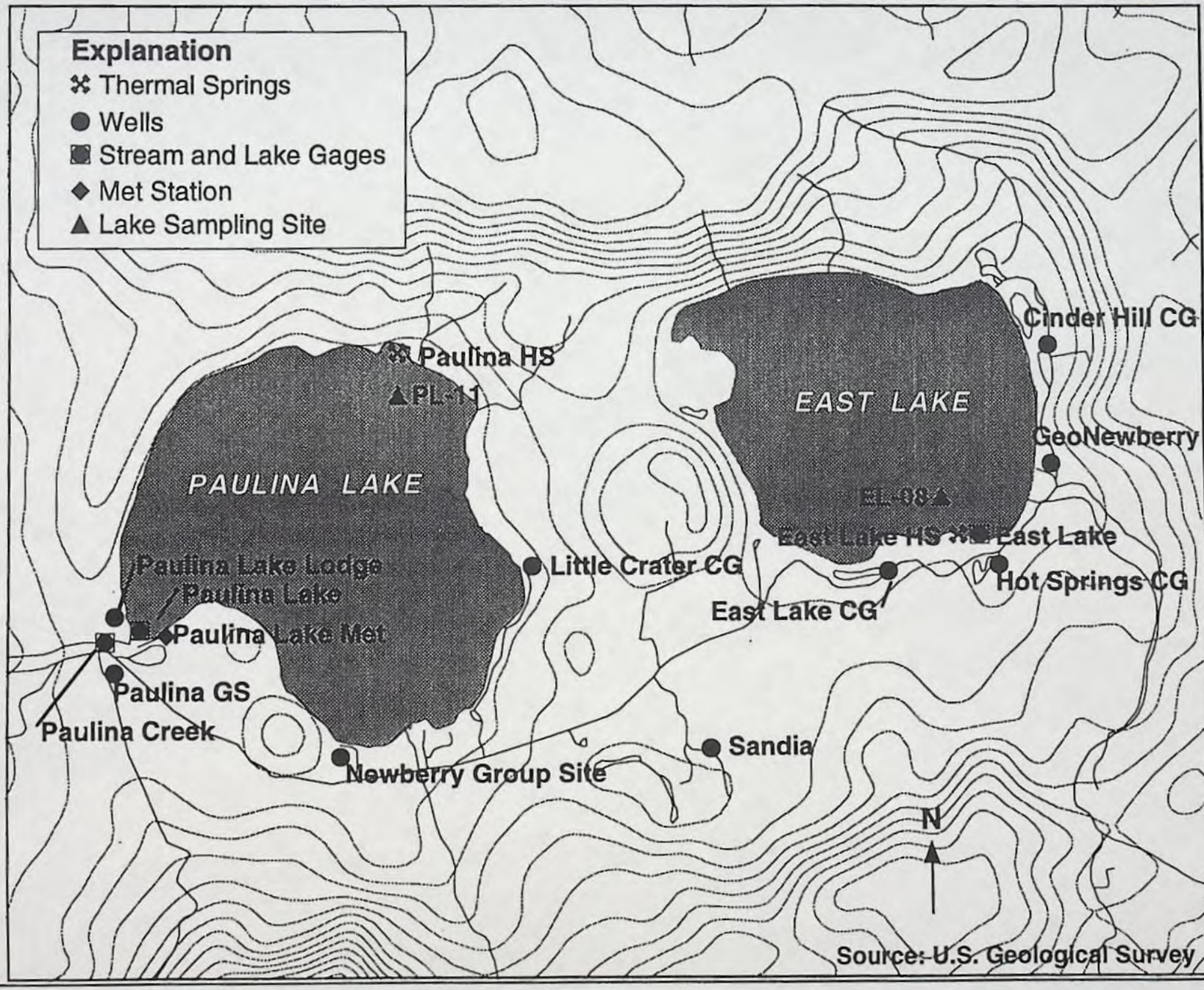
[2]Climate data includes:

Wind speed
Relative humidity
Precipitation
Solar radiation
Temperature

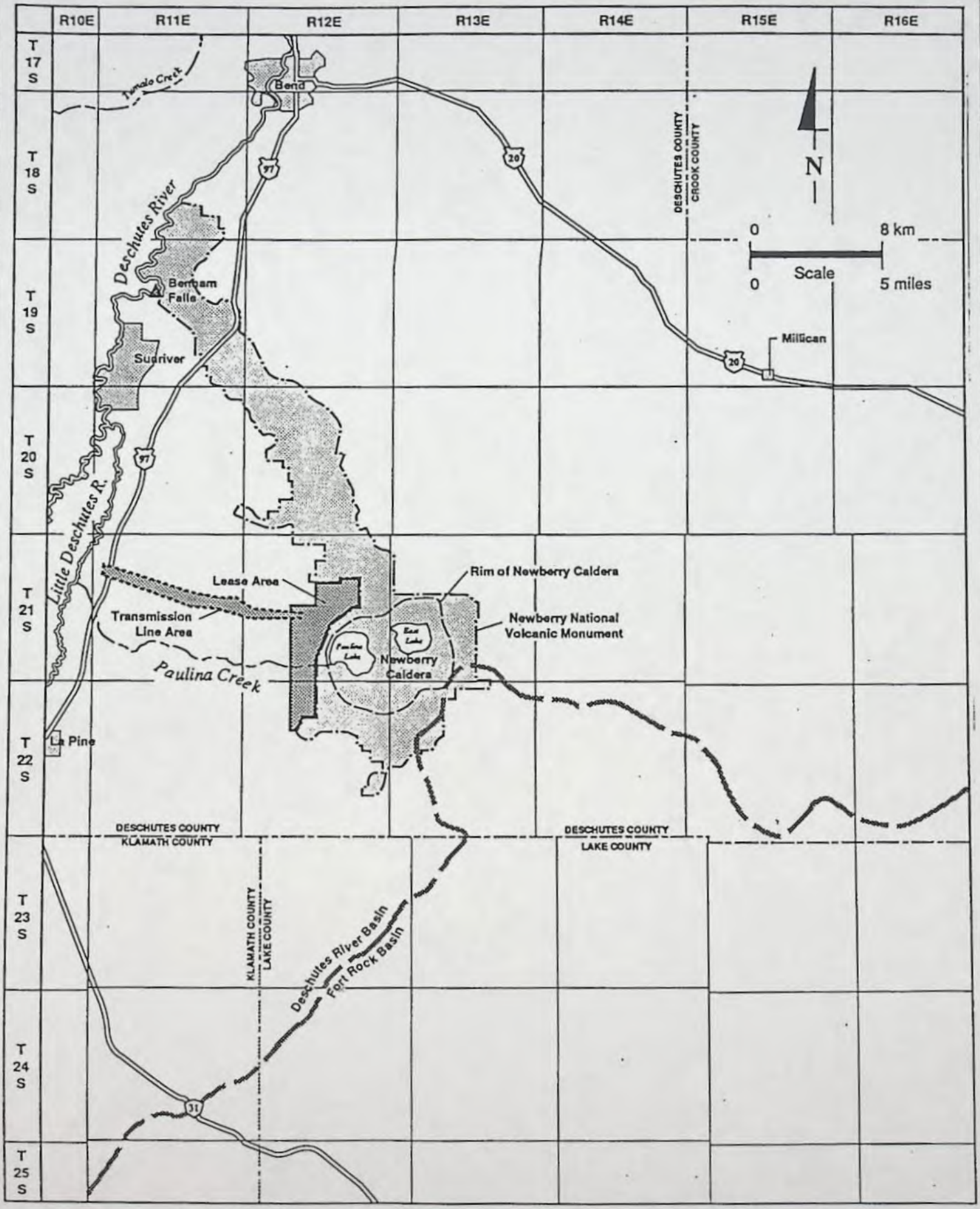
[3]Chemical analyses include:

Temperature	Mercury
Specific conductance	Iron
pH	Manganese
Alkalinity	Dissolved solids
Dissolved oxygen	Oxygen 18/16 ratio
Chloride	Deuterium/hydrogen ratio
Fluoride	Lithium
Nitrite-Nitrate	Arsenic
Phosphorous	Boron
Sulfate	Silica
Ammonia	Potassium
Calcium	Sodium
Magnesium	Strontium
Barium	Zinc

NEWBERRY GEOTHERMAL PILOT PROJECT Deschutes National Forest, Oregon	Newberry Crater Hydrologic Monitoring Sites	Figure 3.3-1



NEWBERRY GEOTHERMAL PILOT PROJECT Deschutes National Forest, Oregon	Watershed Boundary within the Project Vicinity	Figure 3.3-2



3.3.4. Hydrology of Newberry Volcano

Newberry Volcano caldera rim is located near the boundary of the Deschutes and Fort Rock Basins. The northeast, northwest, and southwest sides of the volcano (and its caldera) slope toward the Deschutes River. The southeast side of the volcano slopes toward the Fort Rock Basin. About 90 cm (35 inches) of precipitation fall on the caldera annually, much of it in the form of snow (Sammel 1983; Phillips 1968). This is considerably higher than precipitation amounts in adjacent areas, roughly three times that falling at the City of Bend, located 40 km (25 miles) to the northeast.

3.3.4.1. Surface Water

Newberry Volcano has three primary surface water features: East Lake, Paulina Lake, and Paulina Creek, which drains Paulina Lake. Paulina Lake and East Lake lie within the caldera. Paulina Creek drains into the Little Deschutes River and is the only surface water outlet for the caldera. There are no other perennial surface streams on the Newberry Volcano, and no reported intermittent streams.

East Lake is approximately 55 meters (180 feet) deep and covers approximately 4.1 square km (1,000 acres). East Lake is 12 to 15 meters (40 or 50 feet) higher than Paulina Lake; groundwater appears to flow from East Lake to Paulina Lake. There is no surface outlet for waters draining East Lake. However, water levels remain relatively constant, varying by about 4.9 meters (16 feet), suggesting that inflow (runoff) and outflow (evaporation/groundwater recharge) tend to balance one another (Phillips 1968; Dames & Moore 1994).

The elevation of Paulina Lake's water surface is controlled by a dam at its outlet to Paulina Creek. Paulina Lake levels have been manipulated since 1899. It has an area of 6.1 square km (1,500 acres) and is approximately 76.2 meters (250 feet) deep. Sammel (1983) estimated the lake outflow (Paulina Creek discharge) to be about 16 million cubic meters (13,000 acre-feet) per year.

Average precipitation in the caldera totals about 39 million cubic meters (31,900 acre-feet) per year, most of which infiltrates into the ground. Loss of water through evaporation from lakes, surface water, and vegetation and average annual flow from the caldera through Paulina Creek is estimated at 80 percent of total average precipitation. The total annual discharge of Paulina Creek near LaPine (from October 1991 to September 1992) was 11,744,100 cubic meters (9,520 acre-feet). Between 3,085,000 to 8,020,000 cubic meters (2,500 and 6,500 acre-feet) per year is estimated to percolate into the regional groundwater reservoir from the caldera (Sammel 1983).

The quality of water in the two lakes appears to be fairly stable during the year. Both lakes contain water with low concentrations of dissolved substances. East Lake waters have a total dissolved solids content of about 200mg/l. Nutrient and chloride levels are very low in both lakes and heavy metals concentrations are below the detection limit of USGS analytical tests. Both lakes exhibit temperature stratification at most of the periods and stations sampled. Dissolved oxygen content is generally high, except near the lake bottom. (Crumrine and Morgan 1994).

Well and spring water quality in the caldera is quite variable, although water quality is generally similar to that of the lakes. Some wells contain waters with a very low dissolved solids content, less that 100mg/l. Others exhibit total dissolved solids contents of about 800mg/l, about twice the highest level measured in Paulina Lake.

3.3.4.2. Groundwater

Groundwater flow in the shallow aquifer within the project vicinity generally conforms to the surface watersheds. Dames & Moore estimated that 553,000,000 cubic meters (448,000 acre-feet) per year of water percolates into the ground on the flanks of Newberry Volcano and that half of it flows into the upper Deschutes Basin. This represents about 20 percent of the estimated quantity of

water flowing through the basin. As noted above, 3,085,000 to 8,020,000 cubic meters (2,500 to 6,500 acre-feet) per year are estimated to recharge into the regional groundwater from the caldera itself.

The movement of groundwater in the shallow aquifer system at Newberry Volcano is complex and only partially understood. The volcano's flanks are underlain by complexly interbedded lava flows and sediments. Most subhorizontal groundwater flow is probably along the rubble zones at the top and bottom of each flow. Subvertical flow probably occurs between rubble zones where the zones overlap or are cut by fractures. Temperature measurements in boreholes on the west flank indicate that isothermal conditions exist above depths of 600 meters (2,000 feet). These conditions are interpreted to indicate the maximum depth of fresh water circulation in the shallow aquifers. The lower boundary of the aquifer system is believed to represent a major decrease in permeability (Blackwell, 1993) as shown in Figure 3.2-4. Groundwater flow within the caldera is complex and poorly understood. Precipitation inflitrating the permeable soils percolates to a shallow water table at depths of 6 to 15 meters (20 to 50 feet) below ground surface, which probably slopes inward toward the lakes. Under the influence of the water table, shallow groundwater flows laterally toward the lakes into which it discharges. The surface of East Lake is about 13.7 meters (45 feet) higher than that of Lake Paulina, and groundwater must flow westward from East Lake to Lake Paulina and then outward through the breach in the caldera wall through which Paulina Creek flows (Dames & Moore, 1994).

Deeper groundwater flow within the caldera is controlled by the subvertical ring fractures and subhorizontal rock layers as shown in Figure 3.2-4. As noted by Macleod and Sammel in 1982, vertical permeability in the caldera fill and in the collapsed caldera block is low, and any vertical connection would be limited to faults, ring fractures, and brecciated intrusion contacts. Horizontal flow would be limited to permeable zones (rubble zones) with good hydrological connections to water-bearing fractures. These water-bearing zones are likely to be perched above the regional water table. In the deep Newberry 2 test hole, cold water perched aquifers were encountered at depths of 273 meters (896 feet) and 541 meters (1,776 feet), and warm water aquifers were encountered at depths of 341 meters (1,120 feet) and 439 meters (1,440 feet) (Fig. 3.4-3). Below 739 meters (2,425 feet), few permeable zones were encountered.

3.3.4.3. Hot Springs and Geothermal Fluids in Newberry Caldera

There are two distinct components of the hydrothermal system at Newberry Caldera: a shallow hydrothermal system consisting of hot springs and a deep geothermal system consisting of geothermal resources at higher temperatures and depths greater than 396 meters (1,300 feet) below ground surface (Dames & Moore 1994). The high-temperature deeper fluids are described in Section 3.4, Geothermal Resources.

The thermal springs within the caldera are located along Paulina Lake's northwest shore and East Lake's southeast shore. The springs extend from the shoreline a short distance beneath the lake, where their locations are marked by rising columns of CO_2 bubbles. On land, cemented sand deposits along Lake Paulina and altered volcanic rock along East Lake indicate that thermal activity once occurred at higher elevations. The springs are considered to be fumeroles (gas vents) covered by the lakes (Mariner and others 1980). The presence of only steam in the bottom of the deep test hole, Newberry 2, is consistent with this hypothesis.

The degree of direct connection between the shallow and deep hydrothermal systems is probably slight. The Newberry 2 test hole encountered low permeability, hydrothermally altered rock at depths below 213 meters (700 feet) and dense lava flows below 700 meters (2,300 feet)as shown in Figure 3.2-4. Below approximately 700 meters (2,300 feet), the temperature curve in Newberry 2 becomes conductive or linear with depth (Figure 3.4-3), which indicates that most of the permeability in the lower part of the hole has been lost. Additional supporting evidence comes from a comparison of fluid chemistries.

The chemistry of the fluids in the deep hydrothermal system is not known. However, it is assumed that the chemistry of the fluids from the Medicine Lake Highlands in Northern California is similar, because the two volcanos are similar in many other respects (Dames & Moore, 1994). Chemical analyses indicate that certain constituents from the Medicine Lake geothermal fluids, such as chloride, silicon dioxide, sodium, potassium, and lithium, occur at much higher concentrations than in the shallow thermal waters at Newberry Caldera. Of particular interest is the lack of sodium chloride in the waters at Newberry Caldera; sodium chloride is a common element of geothermal fluids. Newberry Caldera's thermal waters do have elevated concentrations of calcium carbonate and sulfates compared to the Medicine Lake geothermal waters. These elevated concentrations support the interpretation that the thermal waters are being heated by steam enriched with carbonates and sulfate and do not represent deep geothermal fluids such as the Medicine Lake geothermal fluids (Mariner 1980, Carothers 1987 and Dames & Moore 1994). In other words, the shallow geothermal system in the caldera does not appear to be receiving large quantities of groundwater from the deeper hydrothermal system. In this sense they are isolated from each other.

A review of regional water quality data indicates that the cold water systems outside of the caldera have no measurable interaction with the deep geothermal system at Newberry Volcano. Geothermal fluids have distinct chemical properties. There is no evidence that regional groundwater quality has been altered by contact with the deep geothermal system (Dames & Moore 1994).

3.3.5. Hydrology of the Project Area

There are no stream flows, except for Paulina Creek, and no standing surface waters (e.g., ponds, lakes) along the western flanks of the Newberry Volcano. Because of permeable soils, virtually all snow or rain runoff percolates into the ground before reaching the creek. Fresh groundwater in the project area flows west toward the Little Deschutes River.

3.3.5.1. Current Water Use

Surface water resources for Deschutes County, including Paulina Creek, are fully "appropriated," and the Oregon Water Resources Department (WRD) no longer grants new surface water rights. Concern has been raised by the WRD that groundwater resources may become depleted with continued population growth and associated development. A comprehensive groundwater resources study for the county and surrounding areas is being undertaken by the USGS and the WRD.

Water users within the upper Deschutes Basin include the communities of Bend, LaPine, and Sunriver; Avion Water Company; Roats Water Company; and users of private wells and golf courses. The City of Bend already fully utilizes its surface water appropriations from the Deschutes River and expects to develop one water well per year that would produce 3.8 million liters (1 million gallons) per day to accommodate anticipated growth. Other water users rely exclusively on groundwater wells. The closest wells to the project area, other than geothermal exploration wells, are non-community, transient wells in the campgrounds 0.8 km (0.5 mile) to the east and in the caldera, and domestic wells about 8 km (5 miles) to the west.

3.4. GEOTHERMAL RESOURCES

3.4.1. Introduction

A geothermal resource can generally be defined as a geologic accumulation of thermal energy potentially exploitable for human purposes (Anderson et al. 1988). Newberry Volcano exhibits many characteristics common to productive geothermal reservoirs elsewhere in the world. However, it is important to understand the following points in relation to this section:

created to properly develop the geothermal resource may outweigh the minor amount of increased soil disturbance that may result.

The construction of the "cross country" transmission line during the development phase would minimize the length of the route but would require the building of a construction/service road for much of the length. Disturbance to soils would be greater constructing the transmission line proposed in Alternative B than that proposed in Alternative A.

4.2.6. Additional Mitigation Measures

No additional mitigation measures are suggested.

4.2.7. Effects of Alternative C (No Action)

The no-action alternative would avoid all the potential adverse impacts discussed in this section for the proposed action and the alternative. There would be no opportunity to learn more about the underground geology of the Newberry area, which would have occurred with exploratory drilling.

4.3. WATER RESOURCES

4.3.1. Impact Overview

Geothermal resource use has the potential to affect water sources and water quality in a number of ways. Typically, however, environmental protection features built into the projects greatly reduce impacts. Potential sources of impacts are the disposal of drilling fluids, excess geothermal fluids, process and cooling wastewaters, and stormwater runoff.

4.3.2. Method of Analysis

Data on existing water resources and their quality were compiled from the sources described in Section 3.3. The capacity of the proposed geothermal facility to generate wastewater streams that could affect water quality was examined. Similarly, the effect of the proposed project on surface and groundwater hydrology was examined. Because wastewaters generated by the project are proposed to be either evaporated or injected into the geothermal reservoir, no dispersion modeling was undertaken. An exception was for the prediction of the effects of deposition of air pollutants on water quality. The Climate and Air Quality analysis (Section 4.5 and Appendices F, J, and L) describe expected project emissions and their dispersion.

4.3.3. Effects Common to Alternatives A and B

4.3.3.1. Drilling Waste

Wastewaters produced during exploratory well drilling, including drilling fluids, cuttings and mud, are proposed to be routed to a sump at each well pad. Each sump would consist of a clay-lined open pond. The capacity of each sump would depend on the number of wells to be located at the well pad and would vary between 2,838,750 and 3,785,000 liters (750,000 to 1,000,000 gallons). Fluids produced during well testing, maintenance, and start-up would also be routed to the sump. The sumps would be sized to accommodate the expected volume of wastewater generated during exploration, testing, and start-up. Wastewaters would be temporarily stored in the sumps and then injected into the geothermal reservoir via the injection wells. As noted in Section 2.4.1.2, if accumulated wastewater in a sump should begin to approach its capacity, then fluids would be routed to another sump or drilling would be discontinued until the water level in the sump could be lowered by injection. Should transportation of the mud slurry or wastewater off-site be necessary, the appropriate permits would be sought from ODEQ.

4.3.3.2. Surface Runoff

During exploration, development, and utilization, stormwater from the bermed equipment areas at the well pads would be routed to the lined sumps. Stormwater accumulating in the sumps would be injected into the geothermal reservoir together with drilling and production wastewaters via injection wells.

During all phases of work that involve construction or demolition, surface soils would be disrupted. Major surface-disturbing construction would occur during exploration, development, and decommissioning. Less extensive construction may occur during utilization, as facilities are modified. During heavy rain, soil erosion would be accelerated in the disturbed areas. However, increased erosion is likely to be limited to localized areas because of the permeable nature of soils at the site. Runoff is unlikely to develop sufficient volume or velocity to carry construction-related silt into a surface water body. Drainage patterns in the project area would carry runoff away from the nearest surface water body, Paulina Creek. The on-site storage and disposal of mud slurry and wastewater will comply with ODEQ rules for degradation of natural surface and groundwater qual.'.y. A Water Pollution Control Facilities or National Pollut' nt Discharge Elimination System (NPDES) permit will be obtained, if necessary.

Where feasible, above-ground pipelines would be laid along existing roads and along other previously disturbed routes to minimize surface disturbance. In addition, construction sites would be graded to avoid concentrating runoff and possibly causing soil erosion.

Runoff, infiltrating stormwater, or snow-melt water could become contaminated with construction materials, if these materials were not stored and handled carefully. If fuel and/or solvents for construction vehicles or heavy equipment were spilled, contaminants could percolate into the ground; however, given site conditions, the quantities involved would not be sufficient to substantially impair groundwater quality.

Soils at the well pad and power plant sites are very permeable. At present, much of the precipitation that falls on the site is intercepted by vegetation and evapotranspires or percolates into the soil. Runoff occurs only during heavy rainfall or periods of unusually rapid snow melt. Development of the proposed project would alter the rates of stormwater runoff and infiltration at the power plant and well pad sites. Vegetation would be cleared from the 10.6 hectare (18.5-acre) power plant site and from up to 14 production and injection well pad sites. At each production well pad site an area of 2 hectares (5 acres) would be cleared. Each finished production well pad would have an area of about 1.4 hectares (3.4 acres). Temporary drainage during construction would be designed to take advantage of the permeable soils.

At the power plant site, an area of about 7.5 hectares (13 acres) would be graded and fenced. Most of the graded area site would be covered by impervious surfaces such as building roofs and concrete and asphalt paving. Paved areas would be enclosed by curbs or berms. Stormwater runoff from the paved equipment areas would be collected in storm drains and piped to an oil/water separator. After oil is removed, the stormwater would be routed to the water storage pond. Roof drains would direct rain water and snow melt to the local topography . The storm drainage system would be designed to contain runoff from the 100-year return frequency storm. The on-site storage and disposal of mud slurry and wastewater will comply with ODEQ rules for degradation of natural surface and groundwater quality. A Water Pollution Control Facilities or National Pollutant Discharge Elimination System (NPDES) permit will be obtained, if necessary. Drainage of the cleared area outside the fence would be unchanged from the existing condition. No site runoff would drain to Paulina Creek or Paulina Lake.

Under normal power plant operating conditions, stormwater runoff and infiltration into the ground would be reduced from the predevelopment condition. There would be no increase in runoff-related soil erosion. The reduction in infiltration, a maximum of 49,300 cubic meters (40 acre-feet) per year would be negligible, relative to the estimated 276 million cubic meters (224,000 acre-feet)

of groundwater recharge that occurs annually on the northern and western slopes of Newberry Volcano.

All potentially contaminated stormwater would be contained and injected into the geothermal reservoir under Alternatives A and B. Accordingly there would be no adverse effect on surface or groundwaters. However, because the proposed project site meets the regulatory definition of an industrial facility with an area of more than 2 hectares (5 acres) it may be necessary to obtain a stormwater discharge permit under the Clean Water Act. The NPDES program is administered by the Oregon Department of Environmental Quality.

4.3.3.3. Sanitary Waste

During exploration, development, utilization, and decommissioning, portable toilets would be installed wherever construction crews are working. Sanitary wastes would be pumped from the portable toilets and trucked offsite to an approved disposal point. There would be no adverse effects on water quality.

Staff operating the geothermal power facility would produce sanitary waste. Sanitary waste would be disposed to an engineered septic system. The septic system would consist of a septic tank and leach field. The system would be sized to handle wastes from 12 people per 8-hour shift and would be installed within the boundary fence. The system would have sufficient capacity to accommodate short-term increases in wastewater flow, which would, for example, occur during bus tours of the facility, without any loss of effectiveness. After treatment in the septic tank, liquid fractions of the waste would percolate into the ground through the leach field. The septic tank would be pumped out periodically and the sludge trucked away for disposal offsite.

4.3.3.4. Groundwater Levels

During utilization, geothermal fluid (hot water mixed with steam) would be routed to high- and low-pressure separators. Steam would be routed to the power plant. Hot water remaining after steam separation would be routed to the injection pumps and injected directly into the geothermal reservoir. Each well pad would be equipped with injection pumps, which would propel wastewaters to injection wells at yet-to-be-determined locations. Three to five injection wells would be used to inject geothermal fluids back into the geothermal reservoir at a depth of about 1,830 to 2,743 meters (6,000 to 9,000 feet). In accordance with Federal and state regulations, the casings of the injection wells would be sealed so that no injected fluid could enter groundwater bodies within 610 meters (2,000 feet) of the surface. Each well pad would also have a clay-lined sump into which fluids would be directed during the time it takes to shut off the wells in an emergency. If an emergency occurred and injection capacity were to be temporarily unavailable, spent geothermal fluid from the production wells would be routed to the sumps. No wastewaters would be disposed to either surface waters or shallow groundwaters; consequently, there would be no effect on surface or groundwater quality. As previously described, plans for sumps and the different disposal methods are subject to approval by the Oregon Department of Environmental Quality and must meet Oregon's antidegradation of natural waters policy.

Geothermal utilization could affect groundwater levels in two ways. The extraction and injection of geothermal fluids and the possible withdrawal of groundwater for the power plant cooling system could both affect groundwater levels. The proposed geothermal production wells are expected to be 1,830 to 2,743 meters (6,000 to 9,000 feet) deep. The extracted geothermal fluids would be a mixture of steam and hot water. Approximately 9.46 million cubic meters (7,670 acre-feet) of brine would be extracted annually. It is expected that 7.51 million cubic meters (6,068 acre-feet) of the fluid extracted would be injected back into the geothermal reservoir. The reinjected fluids would be derived from the low pressure separator and cooling tower blowdown. The remainder of the produced fluid, approximately 1.9 million cubic meters (1,580 acre-feet) per year, would be lost to the atmosphere by evaporation in the power plant cooling towers (Dames & Moore, 1994). This is roughly equivalent to the amount of water used annually by 2,570 typical households.

The net loss of 1.9 million cubic meters (1,580 acre-feet) per year of fluid from the deep geothermal reservoir could potentially affect caldera and regional groundwater levels. However, as noted in Section 3.4, Geothermal Resources, the shallow geothermal system in the caldera does not appear to be directly connected to the deep geothermal reservoir, so no effect on groundwater levels in the caldera would be expected (Dames & Moore, 1994). Effects on the geothermal reservoir are also addressed in the geothermal resources section.

The strata that the geothermal production and injection wells would penetrate are believed to lie at a depth below the ground surface of 1,830 to 2,743 meters (6,000 to 9,000 feet); that is between an elevation of approximately 304.8 meters (1,000 feet) above sea level and an elevation of 609.6 meters (2,000 feet) below sea level. Drinking water wells to the north and west of the proposed project site obtain water from a variety of water-bearing deposits at elevations of about 915 to 1,220 meters (3,000 to 4,000 feet) above sea level. A zone of low-permeability volcanic deposits, the John Day and Clarno Formations, lies between the shallow water-bearing deposits and the geothermal reservoir. It appears unlikely that groundwater in the shallow water-bearing deposits is directly connected to the geothermal reservoir. Thus, a small annual net loss of water from the geothermal zone would not be likely to affect regional groundwater levels.

The project proponent has filed a water rights application with the Oregon Department of Water Resources for 3.08 million cubic meters (2,500 acre-feet) per year of water to be obtained from wells that draw from the relatively shallow aquifers that overlie the geothermal reservoir. Although the power plant would be designed to produce most of its required operating water, the supplementary water source would be used to supply cooling system make-up water and to increase the amount of water returned to the geothermal reservoir through injection. Injection is desirable because it would help to maintain the pressure in the reservoir and extend its useful life. Withdrawal of 3.08 million cubic meters (2,500 acre-feet) per year at the proposed project site would not be likely to substantially affect regional groundwater levels, because the withdrawal would be small compared to total groundwater recharge of 276 million cubic meters (224,000 acre-feet) per year on the western slope of Newberry Volcano. Some local decline in groundwater levels and flow patterns would be expected. Existing wells would not be affected, because they are either several kilometers downstream of the site, or about 3 km (1.8 miles) upstream and isolated in the caldera. All water withdrawal requirements would be subject to approval by the Oregon Department of Water Resources.

4.3.3.5. Power Plant Cooling Water

Steam from the geothermal wells would be piped to the power plant where it would be used to drive a turbine, which would, in turn, drive the electrical generator. Spent steam from the turbines would be converted to water and then be used for cooling. The cooling system would consist of an evaporative cooling tower and a condenser. Water would circulate continuously in the cooling system. The cooling tower would be an approximately four-story- high structure resting on a concrete basin. Fans mounted on the top of the tower would draw air upwards, through the structure, while water trickles down through it. Cooled water would collect in the cooling tower basin and be pumped through the condenser. In the condenser, spent steam would pass over pipes containing cool water. The steam would be condensed and its heat would be transferred to the cooling water. The cooling water would then be recirculated to the top of the cooling tower.

Water must be added to the recirculating cooling system to replace that lost by evaporation. Condensate, spent steam converted to water, would be used as the water supply for the power plant cooling system. In order to prevent buildup of salts, some water would be drained from the recirculating cooling system. This water, referred to as cooling tower blowdown, would be discharged to the water storage pond. The water storage pond would be lined and would have a capacity of 1.36 million liters (360,000 gallons). Accumulated water in the pond would be injected into the geothermal reservoir.

Under cold weather conditions, it is expected that more condensate would be produced than would be needed for cooling system make-up water. Any excess water would accumulate in the cooling

tower basin and would be routed to the water storage pond. Thus, the only wastewaters produced by the power plant would either be evaporated or injected into the geothermal reservoir. Consequently, there would be no effects on surface or shallow groundwater quality from routine discharge of wastewater.

The water storage pond would be equipped with two level-controlled pumps which would pump water from the pond to the injection wells. In the unlikely event that pond and pumping capacity were to be exceeded, the pond water would overflow, through an engineered overflow structure, to the ground surface. Because the local soils are very permeable, it is unlikely that water overflowing from the pond would proceed far before percolating into the ground. Water in storage ponds would be primarily condensate and thus would be unpolluted or, at worst, would contain small amounts of geothermal condensate constituents and the chemical additives used to control algae growth in the cooling system. An overflow from the pond would only occur in the event of an equipment failure. No significant adverse effect on groundwater quality would be expected from pond overflows that last only a few hours or days. It is unlikely that overflows would continue for more than a few hours before the equipment failure was corrected or flow halted.

4.3.3.6. Air Pollutant Deposition

Air pollutants emitted during power plant operation and associated well development and testing would be carried downwind of the site. Some of these pollutants would be deposited on the ground where they could eventually contribute to water pollution. Modeling studies were undertaken by SAIC (1993) and AGI (1994) to determine whether these emissions would have a significant adverse effect on water quality in Paulina and East Lakes. SAIC compared predicted concentrations of various substances present in the top 0.3 meter (1 foot) of lake water due to air pollutant deposition with EPA's and DEQ's water quality criteria. Appendix F-5 contains additional information on the modeling studies.

SAIC made a number of simplifying and conservative assumptions in order to model the potential deposition of air pollutants in Paulina and East Lakes. These are that emissions would be similar to those at other geothermal plants, that all metals and other elements were solubilized or in suspension and transported to the lakes, and that in the lakes they were mixed with the upper 0.3 meters (1 foot) of water. These assumptions represent a worse case scenario, in that some portion of each constituent is likely to remain in the soil or be deposited with sediment on the lake bed and uniform mixing is likely to occur within the lakes.

The results of the SAIC modeling indicated that increased concentrations for all metals and other elements, except for mercury, were significantly below federal drinking water standards and water quality chronic criteria. Values for mercury were below drinking water standards but identical to the water quality criteria. In a follow-up study by AGI Technologies, several lake mixing models were utilized to investigate the effects of mixing on mercury, arsenic, and boron concentrations in the lakes.

The more sophisticated AGI modeling (Appendix L) assumed the lakes were uniformly mixed because they undergo seasonal overturn that extends to the lake beds, and East Lake discharged to Paulina Lake through ground water, and Paulina Lake discharged through Paulina Creek. The mixing models were run for 500 years to determine concentrations at the end of the anticipated 50-year project life and at equilibrium. This more realistic modeling shows:

a. Mercury concentrations would be between 14 percent and 30 percent of the chronic criteria at 50 years and less than 35 percent at equilibrium in 200 years.

b. Arsenic concentrations would be less than 0.00008 percent of the chronic criteria at 50 years and less than 0.0009 percent at equilibrium in 200 years. Even though current baseline arsenic concentrations are above the 10^{-6} carcenogenic human risk level, the incremental increases of arsenic concentrations after 50 years will be only

0.0075-percent of the average baseline arsenic level in Paulina Lake and 0.0046-percent of the average baseline arsenic level in East Lake.

c. Boron concentrations would be less than 0.03 percent of the mean boron concentration in surface waters of the U.S. at 50 years and about 9 percent at equilibrium in 200 years.

The effects of these increases on wildlife are addressed in Section 4.12.

Mercury concentrations in the lakes would be increased by less than 0.00000319 mg/l over the 50-year project duration of the project. The fresh water chronic criteria for mercury is 0.000012 mg/l, which is nearly 4 times greater than the anticipated increase. The federal drinking water standard for mercury is 0.002 mg/l, which is 627 times higher than the anticipated increase. Should the mercury concentrations in the lakes be near the USGS detection level of 0.0001 mg/l, the estimated mercury contribution represents about a 3 percent increase.

If the mercury concentrations in the lakes exceed the chronic criteria value established in Oregon, then a new criteria would be established by the State to account for the elevated natural levels in the lakes. The lakes and Paulina Creek would then be labeled as water quality limited by the State of Oregon, which would require additional protections to minimize any increased inputs to the aquatic system.

The project requires a permit from DEQ for both air emissions and water emissions. Through this permitting process, the determination will be made by DEQ whether any additional mitigation measures are needed to protect the aquatic environment.

Mitigation measures will be used to reduce mercury emissions from the operating power plant. Mercury in gaseous form will be removed from the power plant emissions prior to release to the atmosphere. Removal is a two-step process involving an activated carbon adsorption system and a sulferox removal system. Together these systems operate at 98+ percent efficiency using one carbon unit. Additional units can be added, raising this efficiency level if the mercury content of the geothermal resource necessitate this additional mitigation measure. Mercury levels would be monitored at the sulferox stack and at the cooling tower to document levels of mercury emissions.

Arsenic concentrations in water samples collected by the US Geological Survey between October 1991 and September 1993 were around 0.015 mg/l in Paulina Lake and Paulina Creek and 0.003 mg/l in East Lake (Crumrine and Morgan 1994). Federal drinking water standards maximum contaminant level (MCL) for arsenic is 0.05 mg/l, and fresh water chronic criteria for arsenic is 0.19 mg/l. The existing arsenic concentrations are below these standards. However, the 10^{-6} carcinogenic human risk criteria for arsenic has been published as 0.0000022 mg/l. Clearly the existing arsenic levels in water samples, as determined by the USGS, are above this risk criteria. To assess the potential impact of arsenic contributions from the proposed development on the lakes, the anticipated arsenic contribution was uniformly mixed with lake waters in various models to estimate the increased concentration over the 50 year project duration (Appendix L). At the end of 50 years, the maximum increase in arsenic concentration is estimated to be 0.00000113 mg/l for Paulina Lake and 0.000000137 mg/l for East Lake. As can be seen, these incremental increases are insignificant over baseline values and will not adversely affect either the aquatic ecosystem or its fisheries.

Boron concentrations in the lakes are between 0.85 and 1.00 mg/l (Crumrine and Morgan 1994). No standards have been set for boron, but the average concentration in surface waters in the U.S. is around 1.0 mg/l, and the maximum concentration is around 5.0 mg/l. The mixing models, similar to those for mercury and arsenic, indicate that boron concentrations should increase by less than 0.0000269 mg/l over the 50 year project life. This amount is so small that boron concentrations in the lakes will remain below the national average. According to these data and

calculations, boron contributions from the proposed development are unlikely to pose significant impacts to either the aquatic ecosystem or its fisheries.

4.3.3.7. Chemical and Hazardous Material Spills

Hazardous materials are addressed in detail in Section 4.14. Various potentially hazardous materials and chemicals would be used at the geothermal facility site. They include diesel fuel, lubricating oils, chemicals to control scaling and corrosion in the injection system, and chemicals to maintain water quality in the cooling system. All tanks containing these and any other hazardous substances would be installed above ground and provided with secondary containment. Secondary containment would consist of a curbed or bermed area around the tank, draining to a sump equipped with a valve. The valve would normally be in a closed position. The secondary containment would have a volume equal to 100 to 150 percent of the maximum spill volume. If a tank were to rupture, the spilled material would be confined within the secondary containment. It could then be cleaned up or recovered. Precipitation falling within the secondary containment areas would be retained in the sump and, if uncontaminated, discharged to the water storage pond. No spilled material would leave the well pads or power plant site, and thus there would be no adverse effects on water quality. An Emergency Contingency Plan would be established in the case of accidental spills or discharges. All drilling fluids would be formulated from "non-toxic" components and drilling effluents would be below EPA-defined end-of-pipe toxicity limits.

4.3.3.8. Decommissioning

Decommissioning would involve removal of all equipment and structures from the site. The site would be regraded and the original contours would be restored. Any wastewaters at the site would be injected into the geothermal reservoir before decommissioning the injection wells. Disturbed areas would be revegetated. Short-term adverse effects on water quality, similar to those described for construction activities, could occur during decommissioning. The adverse effects would be eliminated, or lessened, by adoption of proper construction procedures.

4.3.4. Effects Specific to Alternative A

The effects of Alternative A are common to Alternatives A and B and are described above in Section 4.3.3.

4.3.5. Effects Specific to Alternative B

Under Alternative B, the changes in water quality and hydrologic patterns could be more widely distributed than under Alternative A, depending on the choices of sites for the power plant, production wells, and other facilities. The additional mitigation measures incorporated into Alternative B would reduce the risk of water pollution somewhat during construction.

4.3.6. Additional Mitigation Measures That Could Be Applied to Alternatives A or B

Mercury levels in air emissions could be monitored. In addition, analysis of Newberry lakes fish tissues for mercury could be periodically conducted. If high levels of mercury emissions are found, additional mitigation measures, such as additional emission control systems or measures, could be implemented. In the extremely unlikely event that private landowner drinking water supplies are contaminated by geothermal development activities, compensation such as replacement water supplies could be provided.

4.3.7. Effects of Alternative C

Under the no-action Alternative C, the effects associated with construction and operation of the proposed project would not occur.

ATTACHMENT 2 D-13711

United States Department of Agriculture | Forest Service | Deschutes National Forest | 1645 Highway 20 East Bend, OR 97701

Reply to: 1950

Date: July 5, 1994

Dear Reader:

I appreciate your continued interest in the analysis and Environmental Impact Statement (EIS) for the proposed Newberry Geothermal Pilot Project. We are pleased to announce the release of the Final EIS and the Record of Decision (ROD) for the Forest Service and Bureau of Land Management. The Bonneville Power Administration will issue their ROD in thirty days.

We received valuable feedback and comments during the public comment and review period for the Draft EIS. A total of 55 letters or responses were submitted by the public during the comment period. From these the agencies extracted nearly 600 individual comments. No new issues were raised requiring consideration of a new alternative or major changes in the document, however the public input was very useful in the preparation of the Final EIS and in reaching a decision. Some commentors suggested additional mitigation and monitoring measures, noted factual errors in the document, or raised questions on items that were not clearly explained. As a result, some comments led to additional modeling or effects analysis, consideration of additional mitigation or monitoring needs, and clarification of technical information. A Comment Report is available, which includes all public comments received as well as the agencies' responses to each of the comments. We hope you will find this Final EIS to be thorough and easier to read and understand.

At this time we are releasing the following documents to the public:

- Record of Decision (Forest Service and Bureau of Land Management)
- Executive Summary of the Final EIS
- Full Text of the Final EIS
- Appendices to the Full Text
- Comment Report

Additional copies of these documents may be obtained by contacting:

Newberry Geothermal Pilot Project
Fort Rock Ranger District
1230 NE Third Street, Suite A262
Bend, OR 97701
Phone: (503) 383-4703

On behalf of the Bureau of Land Management, Bonneville Power Administration, and Forest Service, I thank you for your interest and involvement in this project.

Sincerely,

Sally Collins

SALLY COLLINS
Forest Supervisor

Attachment 2

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED NEWBERRY GEOTHERMAL PILOT PROJECT

Deschutes National Forest
Deschutes County, Oregon
July 1994

Lead Agency: USDA Forest Service
Responsible Official:
Sally Collins
Deschutes National Forest
1645 Highway 20 East
Bend, OR 97701

For More Information, Contact:
Alice Doremus, Special Projects
Fort Rock Ranger District
1230 NE Third, Suite A262
Bend, OR 97701
(503) 383-4703 or 388-5664

Cooperating Agencies
Bonneville Power Administration, Portland, Oregon
Responsible Official: Randall W. Hardy
Bureau of Land Management, Prineville, Oregon
Responsible Official: James L. Hancock

Abstract

CEE Exploration Company of Portland, Oregon proposes to build and operate a geothermal pilot project and supporting facilities capable of generating 33 megawatts of electric power in the Deschutes National Forest in central Oregon. The facilities would include a power plant, access roads, exploration and production wells, a power transmission line, and a switchyard. The project would consist of four distinct phases: exploration, development, utilization, and decommissioning. The project would be located on the west flank of Newberry Volcano on Federal geothermal leases.

This Environmental Impact Statement analyzes three alternatives for this proposed geothermal pilot project. Each alternative responds differently to the issues and concerns identified in the EIS process.

Alternative A is the proposal submitted by CEE. It includes a single power plant site, 14 well pads for drilling exploration and development wells, a transmission line, access roads and steam pipelines to bring the steam to the power plant.

Alternative B was developed to respond to the issues and provide siting flexibility to make the most efficient use of the geothermal resources while minimizing environmental effects. Many components are similar to those in Alternative A. Major differences are that it proposes different siting locations, a different transmission line route and design, and additional mitigation measures. Alternative B is the agencies' Preferred Alternative.

Alternative C is the No Action Alternative.

TABLE OF CONTENTS

Section Page

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LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

(Appendices are located in a separate volume.)

200.00 EXAM
100.00 1 CFS
150 00 3 CFS
550.00

Application No. G-13711

RECEIVED
JUN 10 1994
Water Resources Dept.
Salem, Oregon

State of Oregon
WATER RESOURCES DEPARTMENT

Application for a Permit to Appropriate Ground Water

Applicant(s) CE Exploration Company
(Please print or type - use dark ink)

Mailing Address: 34 NW First Avenue, Suite 302

Portland (*City*) Oregon (*State*) 97209 (*Zip*) (503)226-3636 (*Daytime Phone No.*)

I (We) make application for a permit to appropriate the following described ground waters of the State of Oregon:

1. ***THE DEVELOPMENT*** *(number of wells, tile lines, infiltration galleries, etc.):* Six Ground Water Wells

If development is less than one mile from a natural stream, give the following:

Distance from development to stream: 0.9 to Paulina Creek

Elevation difference between streambed and development: 0 - 100 ft.

NOTE: Wells must be constructed according to standards set by the department for the construction and maintenance of water wells. If the well is already constructed, please enclose a copy of the well driller's log with this application, and skip to Section 2 below.

Diameter of well: 8" Nominal *Depth in feet:* 800

Type and size of well casing: 6" slotted at production zone *No. of feet:* 750

Estimated depth to water: 700

Type of access port or measuring device: Air line & 4" valve with meter

Wells to be drilled by: Raley's Drilling

Address: 1650 NE Lesley Place, Bend, OR 97701

If the water well is flowing artesian, describe your water control and conservation works:

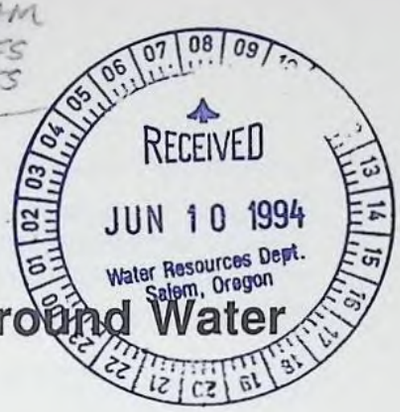
Well is not expected to flow artesian. Well will contain a 11 stage G
submersible pump with a 4" discharge.

6 wells @ 200 gpm each = 1200 GPM not 1600 see item 4.

2. ***TOTAL AMOUNT OF WATER*** *to be applied to beneficial use:* _____ *second,* ***OR*** 1600 *gallons per minute. If water is to be used from mor ground water source, give the quantity of water from each:* _____

200.00 EXAM
100.00 1 CFS
150.00 3 CFS
550.00

Application No. G-13711



State of Oregon
WATER RESOURCES DEPARTMENT

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NOTE: Wells must be constructed according to standards set by the department for the construction and maintenance of water wells. If the well is already constructed, please enclose a copy of the well driller's log with this application, and skip to Section 2 below.

Diameter of well: 8" Nominal *Depth in feet:* 800

Type and size of well casing: 6" slotted at production zone *No. of feet:* 750

Estimated depth to water: 700

Type of access port or measuring device: Air line & 4" valve with meter

Wells to be drilled by: Raley's Drilling

Address: 1650 NE Lesley Place, Bend, OR 97701

If the water well is flowing artesian, describe your water control and conservation works:

Well is not expected to flow artesian. Well will contain a 11 stage Gould submersible pump with a 4" discharge.

2. ***TOTAL AMOUNT OF WATER*** *to be applied to beneficial use: _____ cubic feet per second,* ***OR*** 1600 *gallons per minute. If water is to be used from more than one ground water source, give the quantity of water from each:* _____

3. ***INTENDED USE(s) OF WATER:*** Geothermal power plant cooling tower, project construction, dust control, drilling water for geothermal development and fire control. See attached Draft EIS Summary.

If for more than one use, give the quantity of water from each source for each use; See attached list of uses

*If for **DOMESTIC** use, state the number of households to be supplied;* N/A

*If for **MUNICIPAL OR QUASI-MUNICIPAL** use, state the present population to be served, and an estimate of the future requirements; (List population projections, water needs, anticipated areas to be provided water.)*

N/A

*If for **MINING** use, state the nature (gold, silver, etc.) of the mines to be served;* N/A

*If for **IRRIGATION,** or other land area use, state the TOTAL number of acres to be developed under each use;*

Irrigation N/A

Other (describe)

4. ***DESCRIPTION OF WATER DELIVERY SYSTEM:*** *Include dimensions and type of construction of diversion works, length and dimensions of supply ditches or pipelines, size and type of pump and motor. If for irrigation, describe the type of system (i.e., flood, wheel line, hand line, drip, other).*

Six wells with 4" pipeline from each well to Project Area. Each well to have a 6 CHC, 11 Stage Gould submersible pump, 60 HP, 460 volt, 200 gpm.

5. ***PROJECT SCHEDULE:*** *(List month and year)*

Proposed date construction work will begin August 1994

Proposed date construction work will be completed August 1996

Proposed date water use will be completed August 1997

NOTE: A map prepared by a Certified Water Right Examiner (CWRE) and a complete legal description of the subject property are required under ORS 537.140 and OAR 690 as a part of your application. The legal description may be copied from your deed, title insurance policy, or land sales contract.

6. a) *In the event any deficiencies are noted involving the application map enclosed herein, please return the map with instructions for correction to (check one):*

__X__ *Applicant* _____ *CWRE* _____ *Other (Identify in REMARKS section)*

b) *In the event any deficiencies are noted involving the application, please return the application with instructions for correction to (check one):*

__X__ *Applicant* _____ *CWRE* _____ *Other (Identify in REMARKS section)*

7. *Are all lands involved (including the proposed diversion site, place of use, and access for conveying the water) under your ownership?* No *. If not, list in the REMARKS section below, or on an attached sheet, the names and mailing addresses of the legal owners of all property involved in the proposed development.*

NOTE: Prior to receiving a certificate of water right, the permit holder must submit to the Water Resources Department the results of a pump test meeting the department's standards. The Director will require water level or pump test results every ten years thereafter.

REMARKS: Project is located on the following Federal Geothermal Leases:

OR 45505

OR 45506

OR 11992

OR 47302

OR 47297

which have been issued by the Department of Interior Bureau of Land Management. Leases are also within the Deschutes Unit Area, a federal geothermal well field unit. See attached copy of the Deschutes Unit Agreement.

NOTE: The permit, when issued, is for the beneficial use of water without waste. By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan. It is possible the land use you propose may not be allowed if it is not in keeping with the goals and acknowledged plan. Your city or county planning agency can advise you about the land-use plan in your area.

Dan W. McClain — *Signature of Applicant*

5/25/94 — *Date*

_____ *Signature of Co-Applicant, if any*

_____ *Date*

Application No. G-13711
Permit No.

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

3. Intended Uses of Water

1)	Power Plant Cooling Tower(s) & Fire Control Pond	1,300 gmp	=	2,100 Acft/yr
2)	Well Drilling 2 Acft/well x 10 wells per year	200 gpm	=	20 Acft/yr
3)	Road Construction & Dust Control 100,000 gal/day for 5 months/yr		=	50 Acft/yr
	ANNUAL PEAK CONSUMPTION			2,170 Acft

See enclosed Draft Environmental Impact Statement Executive Summary for additional information.

TO: The Oregon Water Resources Department

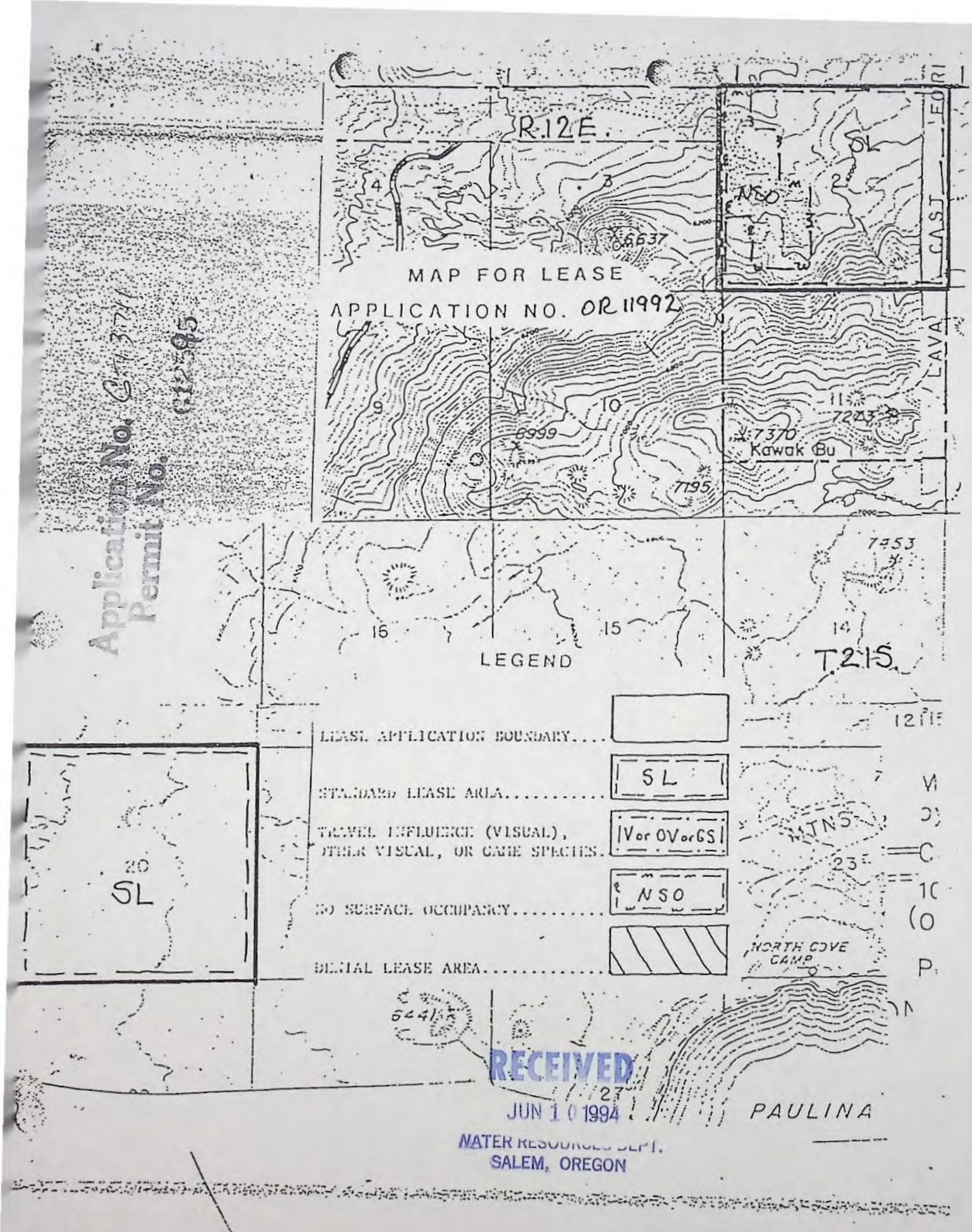
I certify that the information provided in applications G-13710 and G-13711 is an accurate representation of the proposed water use and is true and correct to the best of my knowledge.

David W. McClain 5/25/95

David W. McClain
Project Manger
CE Exploration Company

Jennifer L. Ritchie
Notary 5/25/95

OFFICIAL SEAL
JENNIFER L. RITCHIE
NOTARY PUBLIC - OREGON
COMMISSION NO.041625
MY COMMISSION EXPIRES FEB. 15, 1999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MAP FOR LEASE
APPLICATION NO. OR 11992
Application No. OR 37771
Permit No. 11985
LEGEND
LEASE APPLICATION BOUNDARY....
STANDARD LEASE AREA.....
TRAVEL INFLUENCE (VISUAL), OTHER VISUAL, OR GAME SPECIES.
NO SURFACE OCCUPANCY.....
DENTAL LEASE AREA.....
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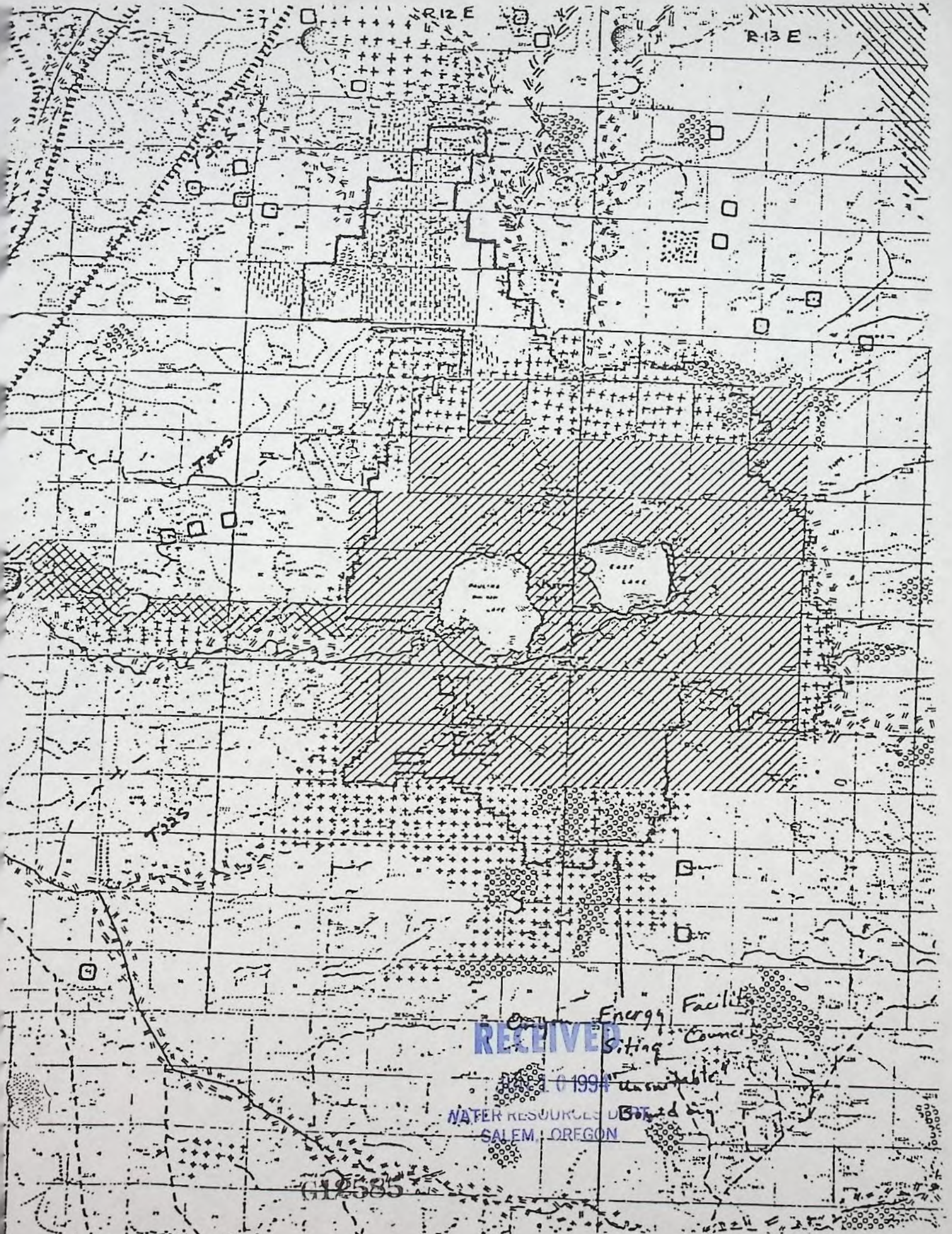
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON



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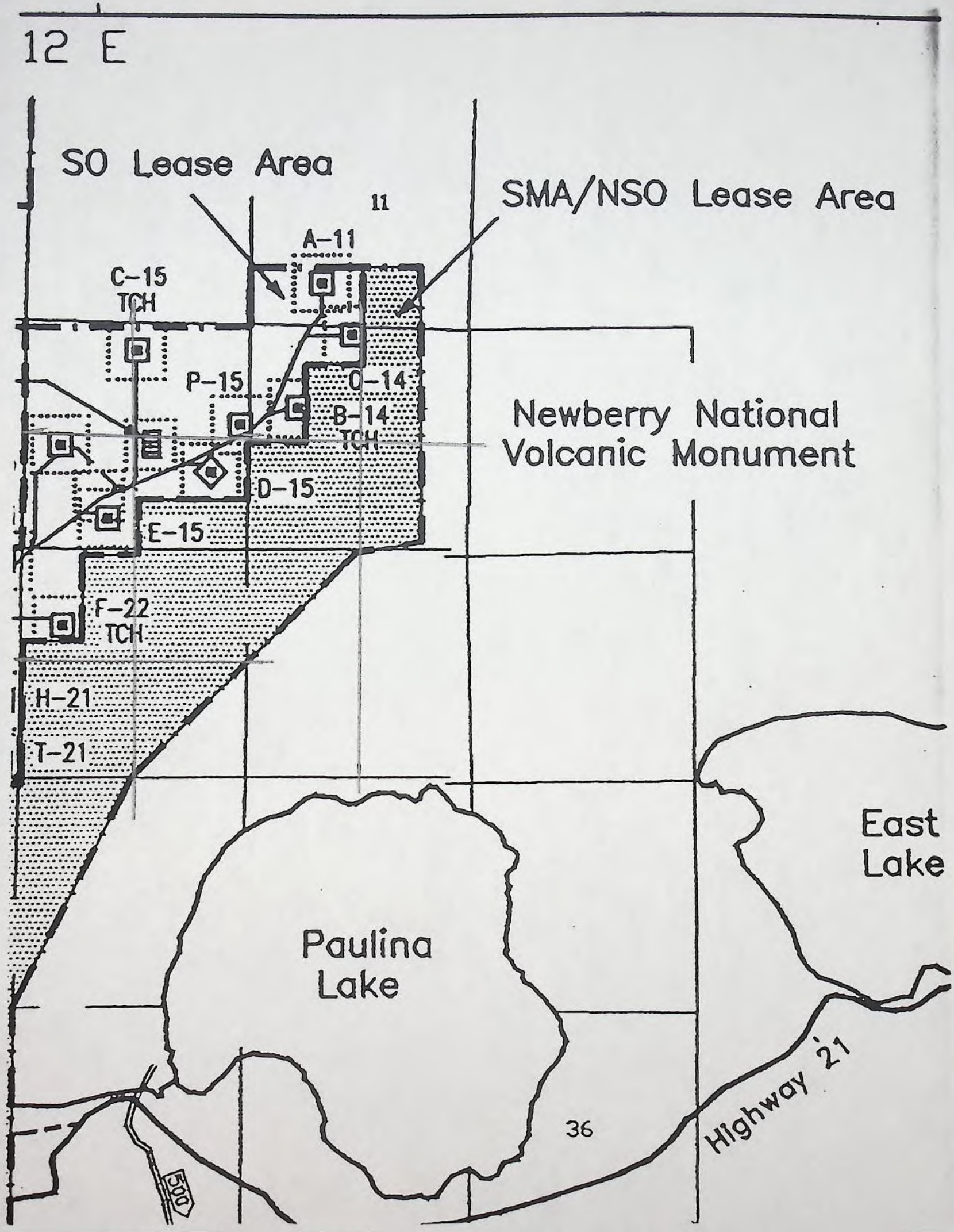
Permit No.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Highway 21
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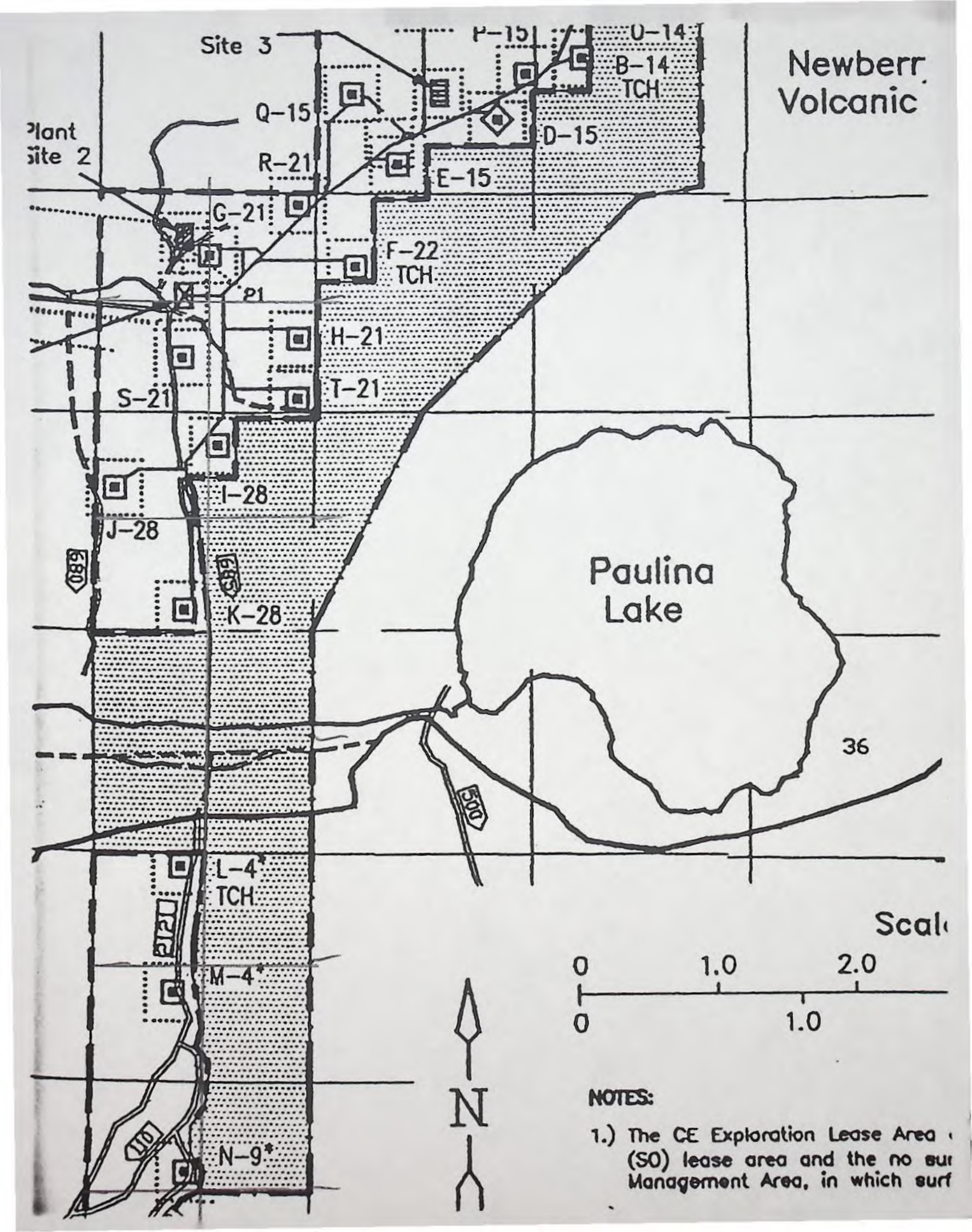
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NOTES:
1.) The CE Exploration Lease Area
(SO) lease area and the no su
Management Area, in which surf

STATE OF OREGON
WATER RESOURCES DEPARTMENT
WATER RIGHTS DIVISION

Before the Director of the Water Resources Department

In the matter of	)	FINAL
Groundwater Application	)	ORDER
G-13711 submitted by	)	
C E EXPLORATION CO.		

FINDINGS OF FACT

Water Use Request

1. C E EXPLORATION CO. requested use of 1,600 GPM, or 3.56 CUBIC FEET PER SECOND (CFS), of water from 6 WELLS in the PAULINA CREEK BASIN, for INDUSTRIAL USE AT A GEOTHERMAL POWER PLANT within the DESCHUTES BASIN.

2. The area of proposed use is in DESCHUTES County within SECTIONS 11, 14, 15, 21, 22, 28, T 21 S, R 12 E, AND SECTIONS 4, 9, T 22 S, R 12 E, W.M.

3. The water delivery system is described by the applicant as follows: SIX WELLS WITH 4" PIPELINE FROM EACH WELL TO PROJECT AREA. EACH WELL TO HAVE A 6 CHC, 11 STAGE GOULD SUBMERSIBLE PUMP, 60 HP, 460 VOLT, 200 AT GPM.

4. The request was made in Application G-13711 which was received by the Water Resources Department on JUNE 10, 1994.

Affected Waters

1. This proposed use of groundwater is above the Deschutes River, a State Scenic Waterway.

2. There are no senior water rights from this point of appropriation.

Department Actions

1. The application was determined to be complete and not defective.

2. The Department determined, based upon OAR 690-09, that the proposed groundwater use will, if properly conditioned, adequately protect the surface water from interference.

3. At this time the Department is unable to find that there is a preponderance of evidence that the proposed use of ground water will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife.

4. A Proposed Final Order for this application was completed and a copy of that review was mailed to the applicant on September 26, 1995.

Assessment

1. In proceeding with evaluation of Application G-13711, the following criteria were found to be relevant by the Department.

a. The Basin Program (OAR Chapter 690, Division 505)
b. The Revised Report Newberry Geothermal Project Hydrology Baseline Study (May 4, 1994)
c. USGS Open File Report # 94-122
d. Groundwater availability as determined by the Groundwater/ Hydrology staff (OAR Chapter 690, Division 9)
e. Effect of use on Deschutes River scenic Waterway as determined by Groundwater/Hydrology staff
f. Pending, senior applications and existing water rights of record
g. Comments received

CONCLUSIONS OF LAW

1. Based upon continued evaluation, the Department finds the determinations of the Proposed Final Order remain valid.

2. Permit recording fees for the proposed use equals $250.00, being $100.00 for the first CFS and $50.00 for each additional CFS or fraction thereof. Recording fees in the amount of $100.00 were paid on May 30, 1995, leaving an unpaid balance of $150.00. Prior to issuance of the attached draft permit, additional permit recording fees in the amount of $150.00 are required.

3. The period of allowed use is YEAR ROUND.

4. The Department finds that no more than 3.56 CFS would be necessary for the proposed use. The amount of water requested, 3.56 CFS is allowed for the proposed INDUSTRIAL USE.

5. A Land Use Information Form from local a government planning office was not required for this application because the proposed wells and places of use are all on Federal lands.

6. The proposed use would not conflict with existing water rights, and, if exercised in accordance with law, rule, and the proposed conditions would not result in injury to existing water users.

7. The proposed use complies with all other rules of the Commission.

8. Pursuant to ORS 390.835, the proposed use, as conditioned, will not reduce streamflows needed to maintain the free-flowing character of the Deschutes River Scenic Waterway in quantities necessary for recreation, fish and wildlife uses.

9. Pursuant to Chapter 416, Oregon laws, 1995, enacted by the 68th Oregon Legislative Assembly, and given the findings listed above, a rebuttable presumption has been established that the use will not impair or be detrimental to the public interest if exercised in the manner described in the attached draft permit.

10. No protests were timely filed in response to the Proposed Final Order of September 26, 1995, and no significant issues or disputes are known to the Department at this time.

11. Therefore, the proposed use, as conditioned, and described in the attached draft permit, would not impair or be detrimental to the public interest.

ORDER

IT IS HEREBY ORDERED that upon payment of outstanding permit recording fees, Application G-13711 in the name of C E EXPLORATION CO. be approved for industrial use as provided on the attached draft permit.

Dated November 30 , 1995

for Martha O. Pagel
Director
Water Resources Department

NOTICE:
This Final Order is issued by the Department pursuant to Chapter 416, Oregon laws, 1995, enacted by the 68th Oregon Legislative Assembly.

If this Final Order has modified the Department's prior findings or conditions, the applicant may request a contested case hearing within 14 days from the date of this order.

Issues on which a contested case hearing may be requested and conducted are limited to issues based on modifications to the Proposed Final Order.

Requests for a contested case hearing must be made in proper form, submitting the information required under Section 11(6), Chapter 416, Oregon Laws, 1995.

Requests for a contested case hearing must be received by the Water Resources Department in Salem, Oregon by 5:00 pm on December 14 , 1995.

Only the applicant and any persons who timely filed a protest may appeal the provisions of this final order.

STATE OF OREGON

COUNTY OF

DRAFT PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS DRAFT PERMIT IS HEREBY ISSUED TO

C E EXPLORATION CO.
34 NW FIRST AVENUE, SUITE 302
PORTLAND, OREGON 97209

The specific limits for the use are listed below along with conditions of use.

APPLICATION FILE NUMBER: G-13711

SOURCE OF WATER: 6 WELLS within the PAULINA CREEK basin

PURPOSE OR USE: INDUSTRIAL USE

QUANTITY: 3.56 CFS

PERIOD OF ALLOWED USE: YEAR ROUND

DATE OF PRIORITY: JUNE 10, 1994

POINT OF DIVERSION LOCATION:
NW 1/4 SE 1/4, SECTION 16 , SE 1/4 NE 1/4, SECTION 20 , SE 1/4 SE 1/4, SECTION 21 , SE 1/4 NW 1/4, SECTION 21 , NE 1/4 NW 1/4, SECTION 28 , SE 1/4 NE 1/4, SECTION 29, T 21 S, R 12 E, W.M.; WELL #1 - 1980 FEET SOUTH AND 1980 FEET EAST OF NW CORNER SECTION 21 , WELL #2 - 4620 FEET SOUTH AND 4620 FEET EAST OF NW CORNER SECTION 21 , WELL #3 - 4620 FEET NORTH AND 1980 FEET EAST OF SW CORNER SECTION 28 , WELL #4 - 1980 FEET NORTH AND 3300 FEET EAST OF SW CORNER SECTION 16 , WELL #5 - 1980 FEET SOUTH AND 660 FEET WEST OF NE CORNER SECTION 20 , WELL #6 - 3300 FEET NORTH AND 660 FEET WEST OF SE CORNER SECTION 29

THE PLACE OF USE IS LOCATED AS FOLLOWS:

SE 1/4 SW 1/4
SECTION 11
NE 1/4 NW 1/4
SW 1/4 NW 1/4
SECTION 14
NW 1/4 NE 1/4
SE 1/4 NE 1/4
NE 1/4 NW 1/4
NW 1/4 SW 1/4
SE 1/4 SW 1/4
NE 1/4 SE 1/4
NW 1/4 SE 1/4
SECTION 15

NE 1/4 NE 1/4
SW 1/4 NE 1/4
NE 1/4 NW 1/4
SE 1/4 NW 1/4
NE 1/4 SW 1/4
SE 1/4 SW 1/4
SECTION 21
SW 1/4 NW 1/4
SECTION 22
NW 1/4 NE 1/4
SW 1/4 NW 1/4
SE 1/4 SW 1/4
SECTION 28
T 21 S, R 12 E, W.M.

NE 1/4 NW 1/4
NE 1/4 SW 1/4
SECTION 4
SE 1/4 NW 1/4
SECTION 9
T 22 S, R 12 E, W.M.

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

This use may be regulated if analysis of data available after the permit or certificate is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department

approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The water user shall develop a plan to monitor and report the impact of water use under this permit on water levels within the aquifer that provides water to the permitted well(s). The plan shall be submitted to the Department within one year of the date the permit is issued and shall be subject to the approval of the Department. At a minimum, the plan shall include a program to periodically measure static water levels within the permitted well(s) or an adequate substitute such as water levels in nearby wells. The plan shall also stipulate a reference water level against which any water-level declines will be compared. If a well listed on this permit (or replacement well) displays a total static water-level decline of 25 or more feet over any period of years, as compared to the reference level, then the water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s). Such action shall be taken until the water level recovers to above the 25-foot decline level or until the Department determines, based on the water user's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The water user shall in no instance allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit.

STANDARD CONDITIONS

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Actual construction of the well shall begin within one year from permit issuance, and shall be completed on or before October 1, 1997. Complete application of the water to the use shall be made on or before October 1, 1998.

Issued this date, November , 1995

_____

Water Resources Department
Martha O. Pagel
Director

TECHNICAL REVIEW CHECKLIST

11/4/94

1. Application: G 13711

2. Review Date: 3/1/95 MM

S indicates information was completed or adequately addressed.
U indicates information is needed, or incomplete, or inadequately addressed
N/A indicates Not Applicable

SUMMARY

V	Land Use not required for projects on Federal Land
NA/yes/no	Substantial SW interference w/GW (if yes, see results of surface water availability analysis)
S	Conflicts
Y	Water Availability (_____) (Water Availability Sub-basin#)
U	The application, map and supporting data are complete and free of defects, oath, fees, map does not show place of use
yes/NA	A TMDL letter has been received for this source or tributary. If yes, the period of use has been adjusted.

3. U The applicant has certified that the information provided in the application is an accurate representation of the proposed use and is true and correct to the best of their knowledge. An oath is required before a permit is issued regardless of the application's priority date.

5. U Application fees:

2000 gpm = 4.45 c
100 + 50 x 4 = 300

Examination fee:	$ 200
Recording fee:	$ 300
TOTAL REQUIRED	$ 500
TOTAL SUBMITTED	$ 200
AMOUNT DUE prior to issuance of permit	$ 300
AMOUNT OVERPAID refund due applicant	$

6. S Proposed dates of beginning and completion of construction, and complete application of water.

7. U - does show location of pivots, does NOT show POU A satisfactory map of the proposed place of water use prepared by a certified water right examiner, unless exempt under OAR 690-14-150(3). (A CWRE map is not required for applications filed before November 9, 1987.)

8. S A written copy of the legal description of the property on which the water is to be used.

9. S — A copy of written authorization, contract or easement permitting access to the land or reservoir not owned by the applicant.

10. N/A — No statement of ownership was required for applications filed before August, 1990.

11. S — The proposed use is not restricted or prohibited by statute.

12. S — The source of water is not withdrawn from appropriation by order of the State Engineer or Water Resources Commission, or legislatively withdrawn under ORS Chapter 538.

13. S — One or more of the use(s) are allowed under the basin program; OAR 690 - 505 - 001(1)(a). MM initials

Uses applied for: Industrial - Geothermal power plant cooling tower, project construction, dust control, drilling water for geothermal development and fire control.

Discussion:

Water Quality Check

14. S — DEQ has provided notice to the WRD concerning limitations of appropriation from surface water sources designated as TMDL streams. This application does not propose to appropriate water from a source that has been identified by the DEQ as a TMDL stream.

15. NA — This application proposes to appropriate water from a source that has been identified by the DEQ as a TMDL stream and has been limited to months when water quality will not be impaired.

Land Use Compatibility: As expressed by the Planning Department of NONE.

15. NA — L.U. not required for projects on Federal Lands. The land uses to be served by proposed water uses (including proposed construction) are allowed or are not regulated by the local comprehensive plan (ordinance section _____).

16. NA — The land uses to be served by proposed water uses (including proposed construction) involve discretionary land use approvals which have been obtained.

17. NA — The local government was notified, and sent no comment pursuant to the rules at the time; land use was presumed in compliance per such statement printed on the application.

For reservoir applications:

18. NA — Plans, specifications and supporting information for the dam and impoundment area must be approved by dam safety before a technical review is issued. Plans and specifications are not required for dams less than 10 feet in height and store less than 9.2 acre-feet. (OAR 690, Div 20)

May 29, 1995

Michael J. Mattick
Water Rights Specialist
Oregon Department of Water Resources
158 12th Street NE
Salem, OR 97310-0210

Reference: Files G-13710 and G-13711

Dear Mr. Mattick,

Thank you for your letter of April 28, 1995. We have had a Certified Water Rights Examiner prepare the additional map you requested which shows the location of the water wells and the location of the geothermal production wells and power plant site where the water will be utilized. Also enclosed is a check for the amount of $400 as specified in your April 28, 1995 letter for permit recording fees.

I have enclosed a notarized oath regarding the applications G-13710 and G-13711. The language of the oath is per your letter of April 28, 1995 advising me of the new administrative rule.

If you need any additional information please contact me and I will be happy to address any concerns the Department may have.

David W. McClain
Project Manager
CE Exploration Company

enclosures

CE EXPLORATION COMPANY
34 N.W. FIRST AVENUE, SUITE 302, PORTLAND, OR 97209 (503) 226-3636 FAX: (503) 226-7695

WATER RESOURCES DEPARTMENT

INTEROFFICE MEMO

July 25, 1995

To: Fred Lissner

From: Mattick (276) MM

Subject: New SSW GW interference review.

G-13711 is an industrial use above a scenic waterway. It is for 6 wells to support construction and operation of a geothermal power plant on the flanks of Newberry Crater. Ken Lite did a division 09 review and found no potential for significant hydraulic interference. Now, for me to prepare a Proposed Final Order, I understand I need to have that re-reviewed. So here it is. As always, the sooner the better.

Thanks MM

Re: Reviews for Diack

Rush Back
T Mattick

G 13710 & 13711

Oregon

DEPARTMENT OF ENERGY

August 30, 1995

Mr. Michael Mattick
Water Resources Department
158 12th Street, NE
Salem, Oregon 97310

Re: Newberry Geothermal Pilot Project

Dear Michael:

I am writing to make sure you are aware of a fact that I had overlooked until now. In our previous conversations, I had assumed that the process of issuing the water right would be folded into the site certificate process of the Energy Facility Siting Council. The applicant on the water right applications contained in the site certificate application, however, is CE Exploration Company. The applicant for the site certificate is CE Newberry, Inc., which is a different entity. From the Council's perspective, then, the project involves a third party water right. The Council will not be in a position to bind the Water Resources Department with respect to issuance of the water right to CE Exploration Company.

Your department will need to make the water right decision independent of the Council process. The Council, in turn, will need to have a basis for determining that CE Exploration Company has a reasonable likelihood of obtaining the necessary rights to appropriation of ground water and that CE Newberry, Inc., has a reasonable likelihood of entering into a contractual or other arrangement with CE Exploration to supply and water to the facility, as required under OAR 345-22-010(2).

Sincerely Yours,

John G. White
Newberry Geothermal Project Manager

cc: Walter Perry

John A. Kitzhaber
Governor

625 Marion Street NE
Salem, OR 97310
(503) 378-4040
FAX (503) 373-7806
Toll-Free 1-800-221-8035

Oregon

WATER
RESOURCES
DEPARTMENT

July 26, 1995

John G. White
Department of Energy
625 Marion Street N.E.
Salem, OR 97310

REFERENCE: Newberry Geothermal Project, Completeness Review and Applicable Statutes

Dear Mr. White,

The site certificate application is complete.

We have reviewed the application for a site certificate. The site certificate application contains one application for a permit to appropriate groundwater. Application G-13711 is for the use of six wells for industrial purposes.

Also on file with the Water Resources Department is application G-13710 for the use of two wells for industrial use. Both applications were filed at the same time. In a telephone conversation on Monday, July 17, 1995, David McClain, of CE Exploration, informed me that the inclusion of only one ground water application in the site certificate application was intentional.

The application is complete.

Commerce Building
158 12th Street NE
Salem, OR 97310-0210
(503) 378-3739
FAX (503) 378-8130

The following is a list of Oregon Statutes and Administrative Rules applicable to the review of the groundwater application:

ORS 537.505 to 537.720 pertains to the issuance of permits for the use of groundwater;
ORS 390.835 pertains to the issuance of groundwater permits within or above state scenic waterways;
OAR Chapter 690, Division 11 pertains to the issuance of water use permits;
OAR Chapter 690, Division 9 pertains to the groundwater/surface water review our staff must make of groundwater use applications.

Sincerely,

Michael J. Mattick

MICHAEL J. MATTICK
Water Rights Specialist

MJM:

enclosure: Signed Completeness Form

Completeness Review Response Form

To: John G. White, Oregon Department of Energy
625 Marion Street NE, Salem, OR 97310

From: Michael J. Mattick
(your name)

Oregon Water Resources Department
(your agency)

Date: 7/26/95

Subject: Newberry Geothermal Pilot Project

The above-named *reviewing agency* has reviewed the Application for Site Certificate for the Newberry Geothermal Pilot Project. This review was a *completeness* review only and does not imply a finding that the proposed facility complies with our applicable laws and regulations.

We have concluded that: (please check one)

X The application contains the information we need to perform our detailed *substantive* review.

___ The application is not complete. Attached to this form is a written description of the additional information we need to perform our detailed *substantive* review.

Michael J. Mattick
(signature)

WaterWatch
OF OREGON

July 10, 1994

Water Resources Department
158 12th St. N. E.
Salem, OR 97310

RE: Application for Permit #G13711, C E Exploration Co.
Paulina Lake, Deschutes Co., Geothermal Development

WaterWatch has reviewed the limited amount of information contained in the public notice of this water right application. Based upon that information, WaterWatch raises the following issues, questions and concerns:

Is there unappropriated water available for this proposed use? How will the Department determine water availability for this proposed use? What will be the cumulative effect of this proposed use, in combination with other, already existing uses of the aquifer?

Is the groundwater source in question in hydraulic connection with surrounding surface waters? If so, what is the amount of surface water depletion and what effect will this proposed use have on instream flows necessary to protect the public's interest in fish, wildlife, recreation and a health aquatic system? We oppose any application which in any way reduces surface water flows needed for the public uses that are served by any instream water right.

Given the importance of this groundwater resource, and the Department's limited enforcement staff, it only makes sense to require this applicant to measure and record water use. Measurement not only helps the Department carry out its statutory mandate to promote the control of water resources in Oregon for all beneficial uses, it helps the Department protect the public's interest in assuring the use is within the bounds of the permit. ORS 536.220(1)(a), 537.170(5)

Will this proposed use be compatible with Goal 5 elements in the local comprehensive plan?

It is a high priority of the state to eliminate waste and improve the efficiency of water use. OAR 690-410-060(1) Statewide policy also calls upon water users to use and maintain their water systems in a manner consistent with the state's priority. What conditions are proposed for this permit that will carry out and encourage compliance with state policy?

Is this an existing illegal use of water? If so, will the continued use without a permit cause harm to existing water rights and the public interest?

We request copies of the draft permit and the Department's technical review of this application.

Sincerely,

Jim Myron

bc:

WaterWatch of Oregon, Inc. 921 S.W. Morrison, Suite 438 Portland, Oregon 97205 (503) 295-4039

Application No. G-13711
Permit No.

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

VIA FEDERAL EXPRESS

May 24, 1994

David McClain
CE Exploration
34 NW First Avenue, Suite #302
Portland, OR 97209

Dear Dave:

Per your request please find enclosed copies of Newberry leases, assignments and stipulations for OR45505, OR45506, OR47297, OR47302 and OR11992. Also enclosed is a copy of the BLM Approval Letter of the Deschutes Unit dated April 20, 1992.

Sincerely,

Virginia Mortensen

Virginia Mortensen
Lease Administrator

Enclosures

CALIFORNIA ENERGY COMPANY
10831 OLD MILL ROAD, OMAHA, NEBRASKA 68154 (402) 330-8900 FAX: (402) 330-9888

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Oregon State Office
P.O. Box 2965 (1300 N.E. 44th Avenue)
Portland, Oregon 97208

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
3280 (920)
OR 47842X

Application No. G-1371(
Permit No.

April 20, 1992

Philip H Essner, Vice President
CE Exploration Company, Inc.
10831 Old Mill Road
Omaha, Nebraska 68154

Dear Mr. Essner:

We have reviewed your documents submitted for the proposed Deschutes Unit. Our review included the degree of overall effective control and control relative to geology, estimated heat content, power marketing and experience, and completeness and accuracy of Unit Agreement and Plan of Operation. Based on our review your Deschutes Unit Agreement is approved. This agreement has been designated UA-OR 47842X, and is effective as of the date of approval.

We have decided that in the interest of conservation of resources and to insure orderly and proper development of the area, that all lessees and working interests of record for lease OR 45506, Unit Tract 1, be required to join the approved Deschutes Unit. Our authority to take this action is specified in Sec. 4 of the geothermal lease which states in part, "Lessor reserves the right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these lands." In making this determination we note that over 87% of the working interests in OR 45506 have agreed to join the Deschutes Unit. We reserve the right to require others within the confines of the Unit boundary to also join the Deschutes Unit, if deemed necessary.

This Unit provides for drilling of four obligation wells and subsequent drilling obligations pursuant to Article XI of the Unit Agreement. The obligation wells are considered to be contractual commitments on the part of the Unit Operator to the United States. Any extensions of time and critical dates specified in the Unit Agreement will require written justification and documentation and the Authorized Officer's approval prior to any critical date or time period. As we have advised in earlier correspondence, no obligation drilling may commence until after appropriate approvals by BLM and Deschutes

Encl. #1

National Forest, including identification of conditions through the NEPA process. A collective Corporate Surety Bond, of an appropriate amount, specific to the Deschutes Unit, will be required.

Enclosed is one copy of the approved Unit Agreement for your records. We request that you furnish all interested principals with appropriate evidence of this approval. Approval of the Deschutes Unit Agreement does not warrant or certify that the Unit Operator and other holders of operating rights hold legal or equitable title to those rights in the subject leases which are committed to the Unit.

Sincerely,

Patrick H. Geehan
Deputy State Director
for Mineral Resources

Enclosure
1 - Approved Unit Agreement, w/Exhibits A & B

(w/Encl.)
cc: Deschutes NF
Region 6 NF
Prineville DO
Unit File, Mineral Resources Div. (OR920)
Branch of Lands & Minerals Operation (OR943)
DOGAMI, Dennis Olmstead

ORIGINAL

UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION
OF THE
DESCHUTES UNIT
COUNTY OF DESCHUTES

THIS AGREEMENT, entered into as of the 5th day of February, 1992, by and between the parties subscribing, ratifying, or consenting hereto, and herein referred to as the "parties hereto."

WITNESSETH:

WHEREAS the parties hereto are the owners of working, royalty, or other geothermal resources interests in land subject to this Agreement; and

WHEREAS the Geothermal Steam Act of 1970 (84 Stat. 1566), hereinafter referred to as the "Act," authorizes Federal lessees and their representatives to unite with each other, or jointly or separately with others, in collectively adopting and operating under a cooperative or unit plan of development or operation of any geothermal resources pool, field, or like area, or any part thereof, for the purpose of more properly conserving the natural resources thereof, whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS the parties hereto hold sufficient interest in the Deschutes Unit Area covering the land herein described to effectively control operation therein; and

WHEREAS it is the purpose of the parties hereto to conserve natural resources, prevent waste, and secure other benefits obtainable through development and operations of the area subject to this Agreement under the terms, conditions, and limitations herein set forth;

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this Agreement their respective interests in the below-defined Unit Area, and agree severally among themselves as follows:

ARTICLE I - ENABLING ACT AND REGULATIONS

1.1 The Act and all valid pertinent regulations, including operating and unit plan regulations, heretofore or hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands.

1.2 As to non-Federal lands, the geothermal resources operating regulations in effect as of the effective date hereof governing drilling and producing operations, not inconsistent with the laws of the State in which the non-Federal land is located, are hereby accepted and made a part of this agreement.

ARTICLE II - DEFINITIONS

2.1 The following terms shall have the meanings here indicated:

(a) Geothermal Lease. A lease issued or administered under the act of December 24, 1970 (84 Stat. 1566), pursuant to the leasing regulations contained in 43 CFR Group 3200 and , unless the context indicates otherwise, "lease" shall mean a geothermal lease.

(b) Unit Area. The area described in Article III of this Agreement.

(b) Unit Area. The area described in Article III of this Agreement.

(c) Unit Operator. The person, association, partnership, corporation, or other business entity designated under this Agreement to conduct operations on Unitized Land as specified herein.

(d) Participating Area. That part of the Unit Area which is deemed to be productive from a horizon or deposit and to which production would be allocated in the manner described in the unit agreement assuming that all lands are committed to the unit agreement.

(e) Working Interest. The interest held in geothermal resources or in lands containing the same by virtue of a lease, operating agreement, fee title, or otherwise, under which, except as otherwise provided in this Agreement, the owner of such interest is vested with the right to explore for, develop, produce and utilize such resources. The right delegated to the Unit Operator as such by this Agreement is not to be regarded as a Working Interest.

(f) Secretary. The Secretary of the Interior or any person duly authorized to exercise powers vested in that officer.

(g) Director. The Director of the Bureau of Land Management.

(h) Authorized Officer. Any person authorized by law or by lawful delegation of authority in the Bureau of Land Management to perform the duties described.

ARTICLE III - UNIT AREA AND EXHIBITS

3.1 The area specified on the map attached hereto marked Exhibit "A" is hereby designated and recognized as constituting the Unit Area, containing 17,821.33 acres, more or less.

The above described Unit Area shall when practical be expanded to include therein any additional lands or shall be contracted to exclude lands whenever such expansion or contraction is deemed to be necessary or advisable to conform with the purposes of this Agreement.

3.2 Exhibit "A" attached hereto and made a part hereof is a map showing the boundary of the Unit Area, the boundaries and identity of tracts and leases in said area to the extent known to the Unit Operator.

3.3 Exhibit "B" attached hereto and made a part hereof is a schedule showing to the extent known to the Unit Operator the acreage, percentage, and kind of ownership of geothermal resources interests in all lands in the Unit Area.

3.4 Exhibits "A" and "B" shall be revised by the Unit Operator whenever changes in the Unit Area render such revision necessary, or when requested by the Authorized Officer, and not less than three copies of the revised Exhibits shall be filed with the Authorized Officer.

ARTICLE IV - CONTRACTION AND EXPANSION OF UNIT AREA

4.1 Unless otherwise specified herein, the expansion and/or contraction of the Unit Area contemplated in Article 3.1 hereof shall be effected in the following manner:

(a) Unit Operator either on demand of the Director or on its own motion and after prior concurrence by the Director, shall prepare a notice of proposed expansion or contraction

describing the contemplated changes in the boundaries of the Unit Area, the reasons therefore, and the proposed effective date thereof, preferably the first day of a month subsequent to the date of notice.

(b) Said notice shall be delivered to the Authorized Officer, and copies thereof mailed to the last known address of each Working Interest Owner, Lessee, and Lessor whose interests are affected, advising that 30 days will be allowed for submission to the Unit Operator of any objections.

(c) Upon expiration of the 30-day period provided in the preceding item (b) hereof, Unit Operator shall file with the Authorized Officer evidence of mailing of the notice of expansion or contraction and a copy of any objections thereto which have been filed with the Unit Operator, together with an application in sufficient number, for approval of such expansion or contraction and with appropriate joinders.

(d) After due consideration of all pertinent information, the expansion or contraction shall, upon approval by the Authorized Officer, become effective as of the date prescribed in the notice thereof.

4.2 Unitized Leases, insofar as they cover any lands which are excluded from the Unit Area under any of the provisions of this Article IV may be maintained and continued in force and effect in accordance with the terms, provisions, and conditions contained in the Act, and the lease or leases and amendments thereto, except that operations and/or production under this Unit Agreement shall not serve to maintain or continue the excluded portion of any lease.

4.3 All legal subdivisions of unitzed lands (i.e. 40 acres by Governmental survey of its nearest lot or tract equivalent in instances of irregular surveys), no part of which is entitled to be within a Participating Area on the fifth anniversary of the effective date of the initial Participating Area established under this Agreement, shall be eliminated automatically from this Agreement effective as of said fifth anniversary and such lands shall no longer be subject to this Agreement unless diligent drilling operations are in progress on an exploratory well on said fifth anniversary, in which event such lands shall not be eliminated from the Unit Area for as long as exploratory drilling operations are continued diligently with not more than four (4) months time elapsing between the completion of one exploratory well and the commencement of the next exploratory well.

4.4 An exploratory well, for the purposes of this Article IV is defined as any well regardless of surface location, projected for completion in a zone or deposit below any zone or deposit for which a Participating Area has been established and is in effect, or any well, regardless of surface location, projected for completion at a subsurface location under Unitized Lands not entitled to be within a Participating Area.

4.5 In the event an exploratory well is completed during the four (4) months immediately preceding the fifth anniversary of the initial Participating Area established under this Agreement, lands not entitled to be within a Participating Area shall not be eliminated from this Agreement on said fifth anniversary, provided the drilling of another exploratory well is commenced under an approved Plan of Operation within four (4) months after the completion of said well. In such event, the land not entitled to be in participation shall not be eliminated form the Unit Area so long as exploratory drilling operations are continued diligently with not more than four (4) months time elapsing between the completion of one exploratory well and the commencement of the next exploratory well.

4.6 With prior approval of the Authorized Officer, a period of time in excess of four (4) months may be allowed to elapse between the completion of one well and the commencement of the next well without the elimination of nonparticipating acreage.

4.7 Unitized lands proved productive by drilling operations which serve to delay automatic elimination of lands under this Article IV shall be incorporated into a Participating Area (or Areas) in the same manner as such lands would have been incorporated in such areas had such lands been proven productive during the year preceding said fifth anniversary.

4.8 In the event nonparticipating lands are retained under this Agreement after the fifth anniversary of the initial Participating Area as a result of exploratory drilling operations, all legal subdivisions of unitized land (i.e., 40 acres by Government survey or its nearest lot or tract equivalent in instances of irregular surveys), no part of which is entitled to be within a Participating Area shall be eliminated automatically as of the 121st day, or such later date as may be established by the Authorized Officer, following the completion of the last well recognized as delaying such automatic elimination beyond the fifth anniversary of the initial Participating Area established under this Agreement.

ARTICLE V - UNITIZED LAND AND UNITIZED SUBSTANCES

5.1 All land committed to this Agreement shall constitute land referred to herein as "Unitized Land." All geothermal resources in and produced from any and all formations of the Unitized Land are unitized under the terms of this agreement and herein are called "Unitized Substances."

ARTICLE VI - UNIT OPERATOR

6.1 CE Exploration Company is hereby designated as Unit Operator and by signature hereto as Unit Operator agrees and consents to accept the duties and obligations of Unit Operator for the discovery, development and production, distribution and unitization of Unitized Substances as herein provided. Whenever reference is made herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as an owner of interest in Unitized Substances, and the term "Working Interest Owner" when used herein shall include or refer to Unit Operator as the owner of a Working Interest when such an interest is owned by it.

ARTICLE VII - RESIGNATION OR REMOVAL OF UNIT OPERATOR

7.1 Prior to the establishment of a Participating Area, hereunder, Unit Operator shall have the right to resign. Such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator or terminate Unit Operator's rights, as such, for a period of six (6) months after notice of its intention to resign has been served by Unit Operator on all Working Interest Owners and the Authorized Officer, nor until all wells then drilled hereunder are placed in a satisfactory condition for suspension or abandonment whichever is required by the Authorized Officer, unless a new Unit Operator shall have been selected and approved and shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

7.2 After the establishment of a Participating Area hereunder Unit Operator shall have the right to resign in the manner and subject to the limitations provided in 7.1 above.

7.3 The Unit Operator may, upon default or failure in the performance of its duties or obligations hereunder, be subject to removal by the same percentage vote of the owners of

Working Interests as herein provided for the selection of a new Unit Operator. Such removal shall be effective upon notice thereof to the Authorized Officer.

7.4 The resignation or removal of Unit Operator under this Agreement shall not terminate its right, title, or interest as the owner of a Working Interest or other interest in Unitized Substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all wells, equipment, material, and appurtenances used in conducting the unit operations to the new duly qualified successor Unit Operator or, if no such new Unit Operator is elected, to the common agent appointed to represent the Working Interest Owners in any action taken hereunder to be used for the purpose of conducting operations hereunder.

7.5 In all instances of resignation or removal, until a successor Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for performance of the duties and obligations of Unit Operator, and shall not later than 30 days before such resignation or removal becomes effective appoint a common agent to represent them in any action to be taken hereunder.

7.6 The resignation of Unit Operator shall not release Unit Operator from any liability for any default by it hereunder occurring prior to the effective date of its resignation.

ARTICLE VIII - SUCCESSOR UNIT OPERATOR

8.1 If, prior to the establishment of a Participating Area hereunder, the Unit Operator shall resign as Operator, or shall be removed as provided in Article VII, a successor Unit Operator may be selected by vote of the owners of a majority of the Working Interests in Unitized Substances, based on their respective shares, on an acreage basis, in the Unitized Land.

8.2 If, after the establishment of a Participating Area hereunder, the Unit Operator shall resign as Unit Operator, or shall be removed as provided in Article VII, a successor Unit Operator may be selected by vote of the owners of a majority of the Working Interests in Unitized Substances, based on their respective shares, on a participating acreage basis. Provided, that, if a majority but less than 60 percent of the Working Interest in the Participating Lands is owned by a party to this agreement, a concurring vote of one or more additional Working Interest Owners owning 10 percent or more of the Working Interest in the participating land shall be required to select a new Unit Operator.

8.3 The selection of a successor Unit Operator shall not become effective until:

(a) The Unit Operator so selected shall accept in writing the duties, obligations and responsibilities of the Unit Operator, and

(b) The selection shall have been approved by the Authorized Officer.

8.4 If no successor Unit Operator is selected and qualified as herein provided, the Director at his election may declare this Agreement terminated.

ARTICLE IX - ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT

9.1 Costs and expenses incurred by Unit Operator in conducting unit operations hereunder shall be paid and apportioned among and borne by the owners of Working interests; all

in accordance with the agreement or agreements entered into by and between the Unit Operator and the owners of Working Interests, whether one or more, separately or collectively.

9.2 Any agreement or agreements entered into between the Working Interest Owners and the Unit Operator as provided in this Article, whether one or more, are herein referred to as the "Unit Operating Agreement."

9.3 The Unit Operating Agreement shall provide the manner in which the Working Interest Owners shall be entitled to receive their respective share of the benefits accruing hereto in conformity with their underlying operating agreements, leases, or other contracts, and such rights and obligations, as between Unit Operator and the Working Interest Owners.

9.4 Neither the Unit Operating Agreement nor any amendment thereto shall be deemed either to modify any of the terms and conditions of this Agreement or to relieve the Unit Operator of any right or obligation established under this Agreement.

9.5 In case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall govern.

9.6 Three true copies of any Unit Operating Agreement executed pursuant to this Article IX shall be filed with the Authorized Officer prior to approval of this Agreement.

ARTICLE X - RIGHTS AND OBLIGATIONS OF UNIT OPERATOR

10.1 The right, privilege, and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting, producing, distributing or utilizing Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as provided in this Agreement in accordance with a Plan of Operations approved by the Authorized Officer.

10.2 Upon request by Unit Operator, acceptable evidence of title to geothermal resources interests in the Unitized Land shall be deposited with the Unit Operator, and together with this Agreement shall constitute and define the rights, privileges, and obligations of Unit Operator.

10.3 Nothing in this Agreement shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that the Unit Operator, in its capacity as Unit Operator shall exercise the rights of possession and use vested in the parties hereto only for the purposes specified in this Agreement.

10.4 The Unit Operator shall take such measures as the Authorized Officer deems appropriate and adequate to prevent drainage of Unitized Substances from Unitized Land by wells on land not subject to this Agreement.

10.5 The Director is hereby vested with authority to alter or modify from time to time, in his discretion, the rate of prospecting and development and the quantity and rate of production under this Agreement.

ARTICLE XI - PLAN OF OPERATION

11.1 Concurrently with the submission of this Agreement for approval, Unit Operator shall submit a proposed Plan(s) of Operation. The Deschutes Unit Area contains two geographic distinct areas, the western Section and north-eastern Section which have different access, logistical

and environmental factors. The Unit Operator may submit a single Plan of Operations covering both of these areas or concurrently submit separate plans of Operation for each area. Said Plan(s) shall be as complete and adequate as the Authorized Officer may determine to be necessary for timely exploration and/or development and to insure proper protection of the environment and conservation of the natural resources of the Unit Area.

11.2 Prior to the expiration of the initial Plan(s) of Operation, or any subsequent Plan of Operation, Unit Operator shall submit for approval of the Authorized Officer an acceptable subsequent Plan(s) of Operation for the Unit Area which, when approved by the Authorized Officer, shall constitute the exploratory and/or development drilling and operating obligations of Unit Operator under this agreement for the period specified therein.

11.3 Any Plan of Operation submitted hereunder shall:

(a) Specify the number and locations of any wells to be drilled and the proposed order and time for such drilling, and

(b) To the extent practicable, specify the operating practices regarded as necessary and advisable for proper conservation of natural resources and protection of the environment in compliance with Section 1.1.

11.4 The Plan of Operation submitted concurrently with this agreement shall prescribe that within the first available drilling season, after the approval of the Geothermal Drilling Permit (GDP), the Unit Operator shall pursue a progressive exploratory drilling program to be approved by the Authorized Officer. Normally the drilling season is from May to October. Such obligation well exploratory program must fulfill the following criteria:

(a) The Unit Operator shall drill two deep temperature gradient (DTG) wells to a depth of at least 4000 ft. or a lesser depth if a significant gradient is reached and approved by the Authorized Officer.

(b) The Unit Operator shall drill two geothermal flow test wells drilled to a depth of at least 9000 ft. or until at a lessor depth unitized substances are discovered which can be produced in paying quantities.

(c) One of the deep temperature gradient wells and a production-size geothermal flow test well shall be drilled in the western section of the Unit Area.

(d) One of the temperature gradient wells and a geothermal flow test well of an acceptable size shall be drilled in the northeast section of the Unit Area.

The Unit Operator must continue diligent exploration during every drilling season per schedules set forth below, until unitized substances shall be discovered which can be produced in paying quantities (I.E., quantities sufficient to repay the cost of drilling, completing, and producing operations, with a reasonable profit); or until the Unit Operator can establish to the satisfaction of the Authorized Officer that further drilling of an obligation well would be unwarranted or impractical. To qualify for diligent exploration the Unit Operator must at minimum:

(1) Within 3 months of the effective date of the Unit Agreement, submit at least one geothermal drilling permit (GDP) for approval; and

(2) Begin drilling of the deep temperature gradient wells during the first available drilling season after approval of the Plan of Operations and GDP; and

(3) Begin drilling a flow test well for the respective area during the second drilling season after approval of the first GDP. This flow test well obligation may be extended to the third season if there is continuous drilling of DTG wells during the second drilling season.

The Authorized Officer may modify the requirements for progressive exploration set forth in this Article XI when, in his opinion, such modifications will result in continued adequate diligent exploration.

11.5 The initial Plan of Operation and/any subsequent Plans of Operation submitted under this article (XI) shall provide that the Unit Operator initiate a program of continuous drilling during all drilling seasons. The drilling program shall provide for drilling no less than one well at a time and allow for no more than 2 months to elapse between the completion of the DTG well and next DTG well, and for no more than 3 months to elapse to the beginning of a flow test well during a drilling season, until a well capable of producing unitized substances in paying quantities is completed to the satisfaction of the Authorized Officer or until it is reasonably proved that the unitized land is incapable of producing unitized substances in paying quantities.

11.6 When warranted by unforeseen circumstances, the Authorized Officer may grant extension of any or all of the critical dates for exploration drilling operations cited in the initial or subsequent Plans of Operation.

11.7 Until a well capable of producing unitized substances in paying quantities is completed, the failure of Unit Operator to timely drill any of the wells provided for in Plans of Operation required under this Article XI or to timely submit an acceptable subsequent Plan of Operation, shall, after notice of default or notice of prospective default to Unit Operator by the Authorized Officer and after failure of Unit Operator to remedy any actual default within a reasonable time (as determined by the Authorized Officer), result in automatic termination of this Agreement effective as of the date of the default.

11.8 Separate Plans of Operation may be submitted for separate productive zones, subject to the approval of the Authorized Officer. Also subject to the approval of the Authorized Officer, Plans of Operation shall be modified or supplemented when necessary to meet changes in conditions or to protect the interest of all parties to this Agreement.

ARTICLE XII - PARTICIPATING AREAS

12.1 Prior to the commencement of production of Unitized Substances, the Unit Operator shall submit for approval by the Authorized Officer a schedule (or schedules) of all land then regarded as reasonably proved to be productive from a pool or deposit discovered or developed, and other lands as defined in Article 2.1(d); all lands in said schedule (or schedules), on approval of the Authorized Officer, will constitute a Participating Area (or Areas) effective as of the date production commences or the effective date of this Agreement, whichever is later. Said schedule (or schedules) shall also set forth the percentage of Unitized Substances to be allocated, as herein provided, to each tract in the Participating Area (or Areas) so established and shall govern the allocation of production commencing with the effective date of the Participating Area. The acreages of any Participating Area shall be as determined by the most current Bureau of Land Management cadastral survey, applicable to that Participating Area.

12.2 A separate Participating Area shall be established for each separate pool or deposit of Unitized Substances or for any group thereof which is produced as a single pool or deposit and any two or more Participating Areas so established may be combined into one, on approval of the Authorized Officer. The effective date of any Participating Area established after the commencement of actual production of Unitized Substances shall be the first of the month in which is obtained the knowledge or information on which the establishment of said Participating Area is based, unless a more appropriate effective date is proposed by the Unit Operator and approved by the Authorized Officer.

12.3 Any Participating Area (or Areas) established under Articles 12.1 or 12.2 above shall, subject to the approval of the Authorized Officer, be revised from time to time to include additional land then regarded as reasonably proved to be productive from the pool or deposit for which the Participating Area was established or to include lands necessary to unit operations, or to exclude land then regarded as reasonably proved not to be productive from the pool or deposit for which the Participating Area was established or to exclude land not necessary to unit operations and the schedule (or schedules) of allocation percentages shall be revised accordingly.

12.4 Subject to the limitation cited in 12.1 hereof, the effective date of any revision of a Participating Area established under Articles 12.1 or 12.2 shall be the first of the month in which is obtained the knowledge or information on which such revision is predicated, provided, however, that a more appropriate effective date may be used if justified by the Unit Operator and approved by the Authorized Officer.

12.5 No land shall be excluded from a Participating Area on account of depletion of the Unitized Substances, except that any Participating Area established under the provisions of this Article XII shall terminate automatically whenever all operations are abandoned in the pool or deposit for which the Participating Area was established.

12.6 Nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the revision of a Participating Area.

ARTICLE XIII - ALLOCATION OF UNITIZED SUBSTANCES

13.1 All Unitized Substances produced from a Participating Area, established under this Agreement, shall be deemed to be produced equally on an acreage basis from the several tracts of Unitized Land within the Participating Area established for such production.

13.2 For the purpose of determining any benefits accruing under this Agreement, each tract of Unitized Land shall have allocated to it such percentage of said production as the number of acres in the tract included in the Participating Area bears to the total number of acres of Unitized Land in said Participating Area.

13.3 Allocation of production hereunder for purposes other than for settlement of the royalty obligations of the respective Working Interest Owners, shall be on the basis prescribed in the Unit Operating Agreement whether in conformity with the basis of allocation set forth above or otherwise.

13.4 The Unitized Substances produced from a Participating Area shall be allocated as provided herein regardless of whether any wells are drilled on any particular part or tract of said Participating Area.

ARTICLE XIV - RELINQUISHMENT OF LEASES

14.1 Pursuant to the provisions of the Federal leases and 43 CFR 3244.1, a lessee of record shall, subject to the provisions of the Unit Operating Agreement, have the right to relinquish any of its interest in leases committed hereto, in whole or in part; provided, that no relinquishment shall be made of interests in land within a Participating Area without the prior approval of the Director.

14.2 A Working Interest Owner may exercise the right to surrender, when such right is vested in it by any non-Federal lease, sub lease, or operating agreement, provided that each party who will or might acquire the Working Interest in such lease by such surrender or by forfeiture is bound by the terms of this Agreement, and further provided that no relinquishment shall be made of such land within a Participating Area without the prior written consent of the non-Federal Lessor.

14.3 If as the result of relinquishment, surrender, or forfeiture the Working Interests become vested in the fee owner or lessor of the Unitized substances, such owner may:

(1) Accept those Working Interest rights and obligations subject to this Agreement and the Unit Operating Agreement; or,

(2) Lease the portion of such land as is included in a Participating Area established hereunder, subject to this Agreement and the Unit Operating Agreement; and provide for the independent operation of any part of such land that is not then included within a Participating Area established hereunder.

14.4 If the fee owner or lessor of the Unitized Substances does not, (1) accept the Working Interest rights and obligations subject to this Agreement and the Unit Operating Agreement, or (2) lease such lands as provided in 14.3 above within six (6) months after the relinquished, surrendered, or forfeited Working Interest becomes vested in said fee owner or lessor, the Working Interest benefits and obligations accruing to such land under this Agreement and the Unit Operating Agreement shall be shared by the owners of the remaining unitized Working Interests in accordance with their respective Working Interest ownerships, and such owners of Working interests shall compensate the fee owner or lessor of Unitized Substances in such lands by paying sums equal to the rentals, minimum royalties, and royalties applicable to such lands under the lease or leases in effect when the Working Interests were relinquished, surrendered, or forfeited.

14.5 Subject to the provisions of 14.4 above, an appropriate accounting and settlement shall be made for all benefits accruing to or payments and expenditures made or incurred on behalf of any surrendered or forfeited Working Interest subsequent to the date of surrender or forfeiture, and payment of any moneys found to be owing by such an accounting shall be made as between the parties within thirty (30) days.

14.6 In the event no Unit Operating Agreement is in existence and a mutually acceptable agreement cannot be consummated between the proper parties, the authorized officer may prescribe such reasonable and equitable conditions of agreement as he deems warranted under the circumstances.

14.7 The exercise of any right vested in a Working Interest Owner to reassign such Working Interest to the party from whom obtained shall be subject to the same conditions as set forth in this Article XIV in regard to the exercise of a right to surrender.

ARTICLE XV - RENTALS AND MINIMUM ROYALTIES

15.1 Any unitized lease on non-Federal land containing provisions which would terminate such lease unless drilling operations are commenced upon the land covered thereby within the time therein specified or rentals are paid for the privilege of deferring such drilling operations, the rentals required thereby shall, notwithstanding any other provisions of this Agreement, be deemed to accrue as to the portion of the lease not included within a Participating Area and become payable during the term thereof as extended by this Agreement, and until the required drillings are commenced upon the land covered thereby.

15.2 Rentals are payable on Federal leases on or before the anniversary date of each lease year; minimum royalties accrue from the anniversary date of each lease year and are payable at the end of the lease year.

15.3 Beginning with the lease year commencing on or after March 1, 1992, and for each lease year thereafter, rental or minimum royalty for lands of the United States subject to this Agreement shall be made on the following basis:

(a) An advance annual rental in the amount prescribed in unitized Federal leases, in no event creditable against production royalties, shall be paid for each acre or fraction thereof which is not within a Participating Area.

(b) A minimum royalty shall be charged at the beginning of each lease year (such minimum royalty to be due as of the last day of the lease year and payable within thirty (30) days thereafter) of $2 an acre or fraction thereof, for all Unitized Acreage within a Participating Area as of the beginning of the lease year. If there is production during the lease year the deficit, if any, between the actual royalty paid and the minimum royalty prescribed herein shall be paid.

15.4 Rental or minimum royalties due on leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws, and regulations, or by the Unit Operator.

15.5 Settlement for royalty interest shall be made by Working Interest Owners responsible therefor under existing contracts, laws, and regulations, or by the Unit Operator, on or before the last day of each month for Unitized Substances produced during the preceding calendar month.

15.6 Royalty due the United States shall be computed as provided in the operating regulations and paid in value as to all Unitized Substances on the basis of the amounts thereof allocated to unitized Federal land as provided herein at the royalty rate or rates specified in the respective Federal leases.

15.7 Nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental, minimum royalty, or royalty due under their leases

ARTICLE XVI - OPERATIONS ON NONPARTICIPATING LAND

16.1 Any party hereto owning or controlling the Working Interest in any Unitized Land having thereon a regular well location may, with the approval of the authorized officer and at such party's sole risk, costs, and expense, drill a well to test any formation of deposit for which a Participating Area has not been established or to test any formation or deposit for which a Participating Area has been established if such location is not within said Participating Area, unless within 30 days of receipt of notice from said party of his intention to drill the well, the Unit Operator

elects and commences to drill such a well in like manner as other wells are drilled by the Unit Operator under this Agreement.

16.2 If any well drilled by a Working Interest Owner other than the Unit Operator proves that the land upon which said well is situated may properly be included in a Participating Area, such Participating Area shall be established or enlarged as provided in this Agreement and the well shall there after be operated by the Unit Operator in accordance with the terms of this Agreement and the Unit Operating Agreement.

ARTICLE XVII - LEASES AND CONTRACTS CONFORMED AND EXTENDED

17.1 The terms, conditions, and provisions of all leases, subleases, and other contracts relating to exploration, drilling, development, or utilization of geothermal resources on lands committed to this Agreement, are hereby expressly modified and amended only to the extent necessary to make the same conform to the provisions hereof, otherwise said leases, subleases, and contracts shall remain in full force and effect.

17.2 The parties hereto consent that the Secretary shall, by his approval hereof, modify and amend the Federal leases committed hereto and the regulations in respect thereto to the extent necessary to conform said leases and regulations to the provisions of this Agreement.

17.3 The development and/or operation of lands subject to this Agreement under the terms hereof shall be deemed full performance of any obligations for development and operation with respect to each and every separately owned tract subject to this Agreement, regardless of whether there is any development of any particular tract of the Unit Area.

17.4 Drilling and/or producing operations performed hereunder upon any tract of Unitized Lands will be accepted and deemed to be performed upon and for the benefit of each and every tract of Unitized Land.

17.5 Suspension of operations and/or production on all Unitized Lands pursuant to direction or consent of the Secretary or his duly authorized representative shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every tract of Unitized Land. A suspension of operations and/or production limited to specified lands shall be applicable only to such lands.

17.6 Subject to the provisions of Article XV hereof and 17.10 of this Article, each lease, sublease, or contract relating to the exploration, drilling, development, or utilization of geothermal resources of land other than those of the United States committed to this Agreement, is hereby extended beyond any such term so provided therein so that it shall be continued for and during the term of this Agreement.

17.7 Subject to the lease renewal and the readjustment provision of the Act, any Federal lease committed hereto may, as to the Unitized Lands, be continued for the term so provided therein, or as extended by law. This subsection shall not operate to extend any lease or portion thereof as to lands excluded from the Unit Area by the contraction thereof.

17.8 Each sublease or contract relating to the operations and development of Unitized Substances from lands of the United States committed to this Agreement shall be continued in force and effect for and during the term of the underlying lease.

17.9 Any Federal lease heretofore or hereafter committed to any such unit plan embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date of unitization.

17.10 In the absence of any specific lease provision to the contrary, any lease, other than a Federal lease, having only a portion of its land committed hereto shall be segregated as to the portion committed and the portion not committed, and the provisions of such lease shall apply separately to such segregated portions commencing as of the effective date hereof. In the event any such lease provides for a lump-sum rental payment, such payment shall be prorated between the portions so segregated in proportion to the acreage of the respective tracts.

17.11 Upon termination of this Agreement, the leases covered hereby may be maintained and continued in force and effect in accordance with the terms, provisions, and conditions of the Act, the lease or leases, and amendments thereto.

ARTICLE XVIII - EFFECTIVE DATE AND TERM

18.1 This Agreement shall become effective upon approval by the Secretary or his duly authorized representative and shall terminate five (5) years from said effective date unless,

(a) Such date of expiration is extended by the Director, or

(b) Unitized Substances are produced or utilized in commercial quantities in which event this Agreement shall continue for so long as Unitized Substances are produced or utilized in commercial quantities, or

(c) This agreement is terminated prior to the end of said five (5) year period as heretofore provided.

18.2 This Agreement may be terminated at any time by the owners of a majority of the Working Interests, on an acreage basis, with the approval of the authorized officer. Notice of any such approval shall be given by the Unit Operator to all parties hereto.

ARTICLE XIX - APPEARANCES

19.1 Unit Operator shall, after notice to other parties affected, have the right to appear or and on behalf of any and all interests affected hereby before the Department of the Interior, and to appeal from decisions, orders or rulings issued under the regulations of said Department, or to apply for relief from any of said regulations or in any proceedings relative to operations before the Department of the Interior or any other legally constituted authority: Provided, however, That any interested parties shall also have the right, at its own expenses, to be heard in any such proceeding.

ARTICLE XX - NO WAIVER OF CERTAIN RIGHTS

20.1 Nothing contained in this Agreement shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense pertaining to the validity or invalidity of any law of the State wherein lands subject to this Agreement are located, or of the United States, or regulations issued thereunder, in any way affecting such party or as a waiver by any such party of any right beyond his or its authority to waive.

ARTICLE XXI - UNAVOIDABLE DELAY

21.1 The obligations imposed by this Agreement requiring Unit Operator to commence or continue drilling or to produce or utilize Unitized Substances from any of the land covered by this Agreement, shall be suspended while, but only so long as, Unit Operator, despite the exercise of due care and diligence, is prevented from complying with such obligations, in whole or in part, by strikes, Acts of God, Federal or other applicable law, Federal or other authorized governmental agencies, unavoidable accidents, uncontrollable delays in transportation, inability to obtain necessary materials in open market, or other matters beyond the reasonable control of Unit Operator, whether similar to matters herein enumerated or not.

21.2 No unit obligation which is suspended under this section shall become due less than thirty (30) days after it has been determined that the suspension is no longer applicable.

21.3 Determination of creditable "Unavoidable Delay" time shall be made by the Unit Operator subject to approval of the authorized officer.

ARTICLE XXII - POSTPONEMENT OF OBLIGATIONS

22.1 Notwithstanding any other provisions of this Agreement, the Director, on his own initiative or upon appropriate justification by Unit Operator, may postpone any obligation established by and under this Agreement to commence or continue drilling or to operate on or produce Unitized Substances from lands covered by this Agreement when in his judgement, circumstances warrant such action.

ARTICLE XXIII - NONDISCRIMINATION

23.1 In connection with the performance of work under this Agreement, the Operator agrees to comply with all of the provisions of section 202 (1) to (7) inclusive, of Executive Order 11246 (30 FR 12319), as amended by Executive Order 11375 (32 FR 14303), which are hereby incorporated by reference in this Agreement.

ARTICLE XXIV - COUNTERPARTS

24.1 This Agreement may be executed in any number of counterparts no one of which needs to be executed by all parties, or may be ratified or consented to by separate instruments in writing specifically referring hereto, and shall be binding upon all parties who have executed such a counterpart, ratification or consent hereto, with the same force and effect as if all such parties had signed the same document.

ARTICLE XXV - SUBSEQUENT JOINDER

25.1 If the owner of any substantial interest in geothermal resources under a tract within the Unit Area fails or refuses to subscribe or consent to this Agreement, the owner of the Working Interest in that tract may withdraw said tract from this Agreement by written notice delivered to the authorized officer and the Unit Operator prior to the approval of this Agreement by the authorized officer.

25.2 Any geothermal resources interests in lands within the Unit Area not committed hereto prior to approval of this Agreement may thereafter be committed by the owner or owners thereof subscribing or consenting to this Agreement, and, if the interest is a Working Interest, by the owner of such interest also subscribing to the Unit Operating Agreement.

25.3 After operations are commenced hereunder, the right of subsequent joinder, as provided in this Article XXV, by a Working Interest Owner is subject to such requirements or approvals, if any, pertaining to such joinder, as may be provided for in the Unit Operating Agreement. Joinder to the Unit Agreement by a Working Interest Owner, at any time, must be accompanied by appropriate joinder to the Unit Operating Agreement, if more than one committed Working Interest Owner is involved, in order for the interest to be regarded as committed to this Unit Agreement.

25.4 After final approval hereof, joinder by a nonworking interest owner must be consented to in writing by the Working Interest Owner committed hereto and responsible for the payment of any benefits that may accrue hereunder in behalf of such nonworking interest. A nonworking interest may not be committed to this Agreement unless the corresponding Working Interest is committed hereto.

25.5 Except as may otherwise herein be provided, subsequent joinders to this Agreement shall be effective as of the first day of the month following the filing with the authorized officer of duly executed counterparts of all or any papers necessary to establish effective commitment of any tract to this Agreement unless objection to such joinder is duly made within sixty (60) days by the authorized officer.

ARTICLE XXVI - COVENANTS RUN WITH THE LAND

26.1 The covenants herein shall be construed to be covenants running with the land with respect to the interest of the parties hereto and their successors in interest until this Agreement terminates, and any grant, transfer, or conveyance, of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee, or other successor in interest.

26.2 No assignment or transfer of any Working Interest or other interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, photostatic, or certified copy of the instrument of transfer.

ARTICLE XXVII - NOTICES

27.1 All notices, demands or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if given in writing and personally delivered to the party or sent by postpaid registered or certified mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party may have furnished in writing to party sending the notice, demand or statement.

ARTICLE XXVIII - LOSS OF TITLE

28.1 In the event title to any tract of Unitized Land shall fail and the true owner cannot be induced to join in this Agreement, such tract shall be automatically regarded as not committed hereto and there shall be such readjustment of future costs and benefits as may be required on account of the loss of such title.

28.2 In the event of a dispute as to title as to any royalty, Working Interest, or other interests subject hereto, payment or delivery on account thereof may be withheld without liability for interest until the dispute is finally settled: Provided, That, as to Federal land or leases, no payments of funds due the United States shall be withheld, but such funds shall be deposited as

directed by the authorized officer to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

ARTICLE XXIX - TAXES

29.1 The Working Interest Owners shall render and pay for their accounts and the accounts of the owners of nonworking interests all valid taxes on or measured by the Unitized Substances in and under or that may be produced, gathered, and sold or utilized from the land subject to this Agreement after the effective date hereof.

29.2 The Working Interest Owners on each tract may charge a proper proportion of the taxes paid under 29.1 hereof to the owners of nonworking interests in said tract, and may reduce the allocated share of each royalty owner for taxes so paid. No taxes shall be charged to the United States or the State of Oregon or to any lessor who has a contract with his lessee which requires the lessee to pay such taxes.

ARTICLE XXX - RELATION OF PARTIES

30.1 It is expressly agreed that the relation of the parties hereto is that of independent contractors and nothing in this Agreement contained, expressed, or implied, nor any operations conducted hereunder, shall create or be deemed to have created a partnership or association between the parties hereto or any of them.

ARTICLE XXXI - SPECIAL FEDERAL LEASE STIPULATIONS AND/OR CONDITIONS

31.1 Nothing in this Agreement shall modify special lease stipulations and/or conditions applicable to lands of the United States. No modification of the conditions necessary to protect the lands or functions of lands under the jurisdiction of any Federal agency is authorized except with prior consent in writing whereby the authorizing official specifies the modification permitted.

31.2 All Lessees of Record and Working Interests Owners committing to this Unit hereby consent that subsequent lessees of unleased federal geothermal resources within the bounds of the Unit are given the express right to join such leases to the Unit and to join the Unit Operating Agreement.

CE Exploration Company

By: _____

Philip H. Essner

Address: 10831 Old Mill Road
Omaha, NE 68154

Date of Execution:

2/12/92

ACKNOWLEDGMENT

STATE OF NEBRASKA)
) ss.
COUNTY OF DOUGLAS)

The foregoing instrument was acknowledged before me this 12th day of February, 1992, by Philip H. Essner, Vice President of CE Exploration Company.

WITNESS my hand and official seal.

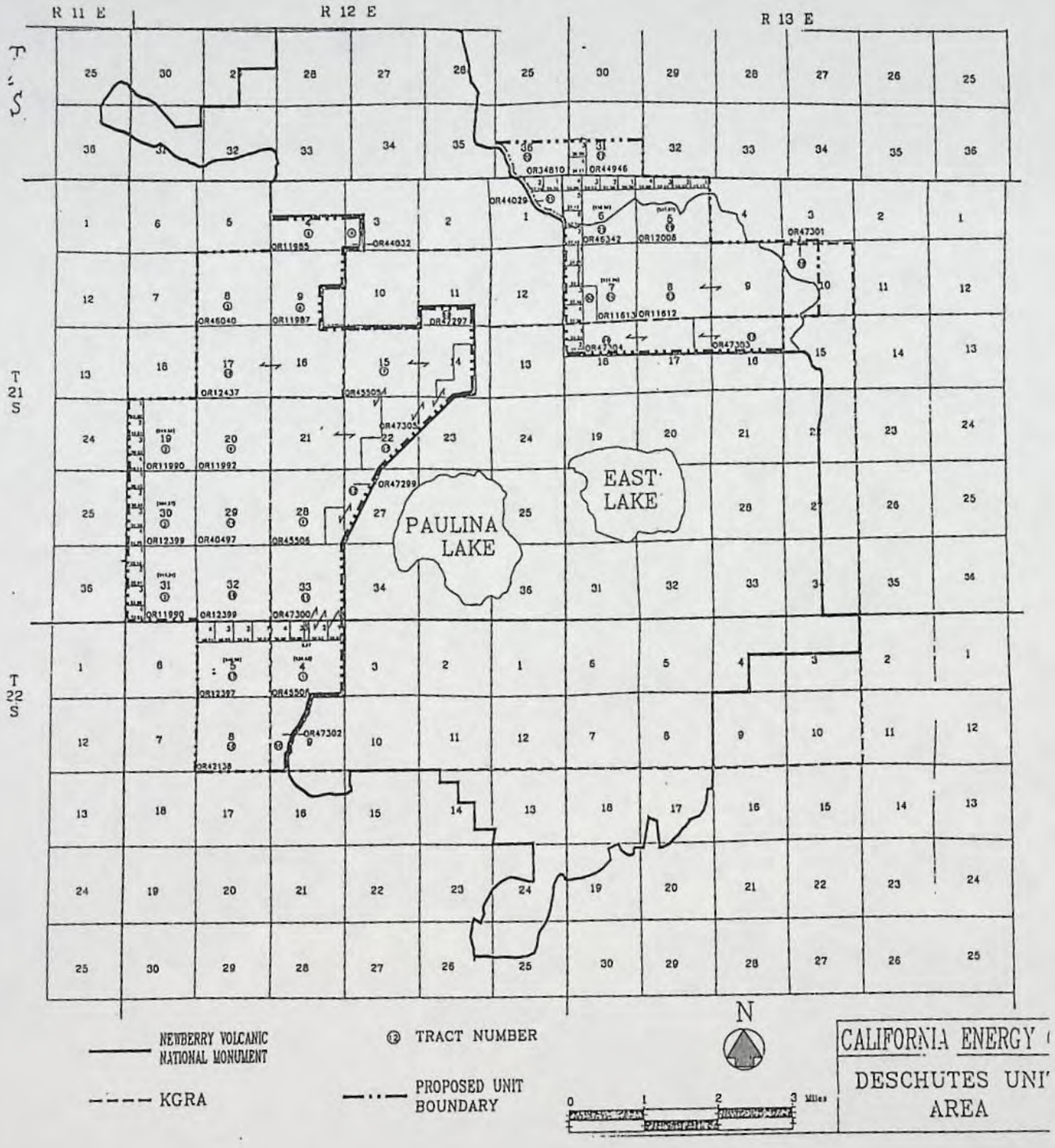
Nancy J. Wilts
Notary Public

Business Address:
10831 Old Mill Road
Omaha, NE 68154

My Commission Expires:

GENERAL NOTARY-State of Nebraska
NANCY J. WILTS
My Comm. Exp. Oct. 27, 1995

EXHIBIT "A" TO THE
DESCHUTES UNIT AGREEMENT



Form 3200-24
(November 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OBM NO. 1004-0038
Expires January 31, 1986

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. OR 45506

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

Read Instructions Before Completing

1. Name
Street
City, State, Zip Code

CE Exploration Co. (87.22%)
c/o California Energy Co., Inc.
10831 Old Mill Road
Omaha, NE 68154

Vulcan Power Co. (9.36%)
316 NW Greenwood
Bend, OR 97701

Terry Allen Kramer
(3.42%)
711 Fifth Avenue
New York, NY 10022

2. Surface managing agency if other than BLM: USDA, FS Unit/Project

Legal description of land requested (segregate by public domain and acquired lands):

T. 21 S., R. 12 E., Meridian Willamette State Oregon County Deschutes
Sec. 28, N½, SW¼, W½SE¼.

T. 22 S., R. 12 E.,
Sec. 4, approximately 30 acres of lot 3 excluding the Newberry Special Management Area, lot 4, S½N½, S½.

RECEIVED
JUN 1 0 1994
WATER RESOURCES DEPT.
SALEM, OREGON

BUREAU OF LAND MANAGEMENT
1992 MAR -2 AM 8:30
OREGON STATE OFFICE
PORTLAND, OR

Total acres applied for 1,109.89
Percent U.S. interest 100%
Total $ 2,220.00

Amount remitted: Filing fee $ 0 Rental fee $ 2,220.00

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

Same as item 2.

Application No. G-13711
Permit No.

Total acres in lease 1,109.89
Rental retained 2,220.00

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

THE UNITED STATES OF AMERICA

by [signature] (Signing Officer)

Chief, Lands and Minerals Adjudication Section (Title)

MAR 2 1992 (Date)

EFFECTIVE DATE OF LEASE MAR 2 1992

Type of lease:

☐ Noncompetitive

☐ Competitive

X ☐ Other Compensatory (P.L. 101-522, 11/5/90)

Eff. date — 4-1-92

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 26th day of FEBRUARY, 19 92.

(Signature of Lessee or Attorney-in-fact)

CE Exploration Company

Signature Page 1 of 3 pages

Subject to additional stipulations attached.
See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: ~~$1 for noncompetitive leases and~~ $2 ~~for competitive leases.~~

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unneccessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 20th day of May, 19 91. Larry Allen J. Cranmer
(Signature of Lessee or Attorney-in-fact)

BUREAU OF LAND MANAGEMENT

1992 MAR -2 AM 8:30

OREGON STATE OFFICE
PORTLAND, OR

Signature Page #3 of 3. JC

Subject to additional stipulations attached. See Exhibit "A"

LEASE TERMS

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If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

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Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

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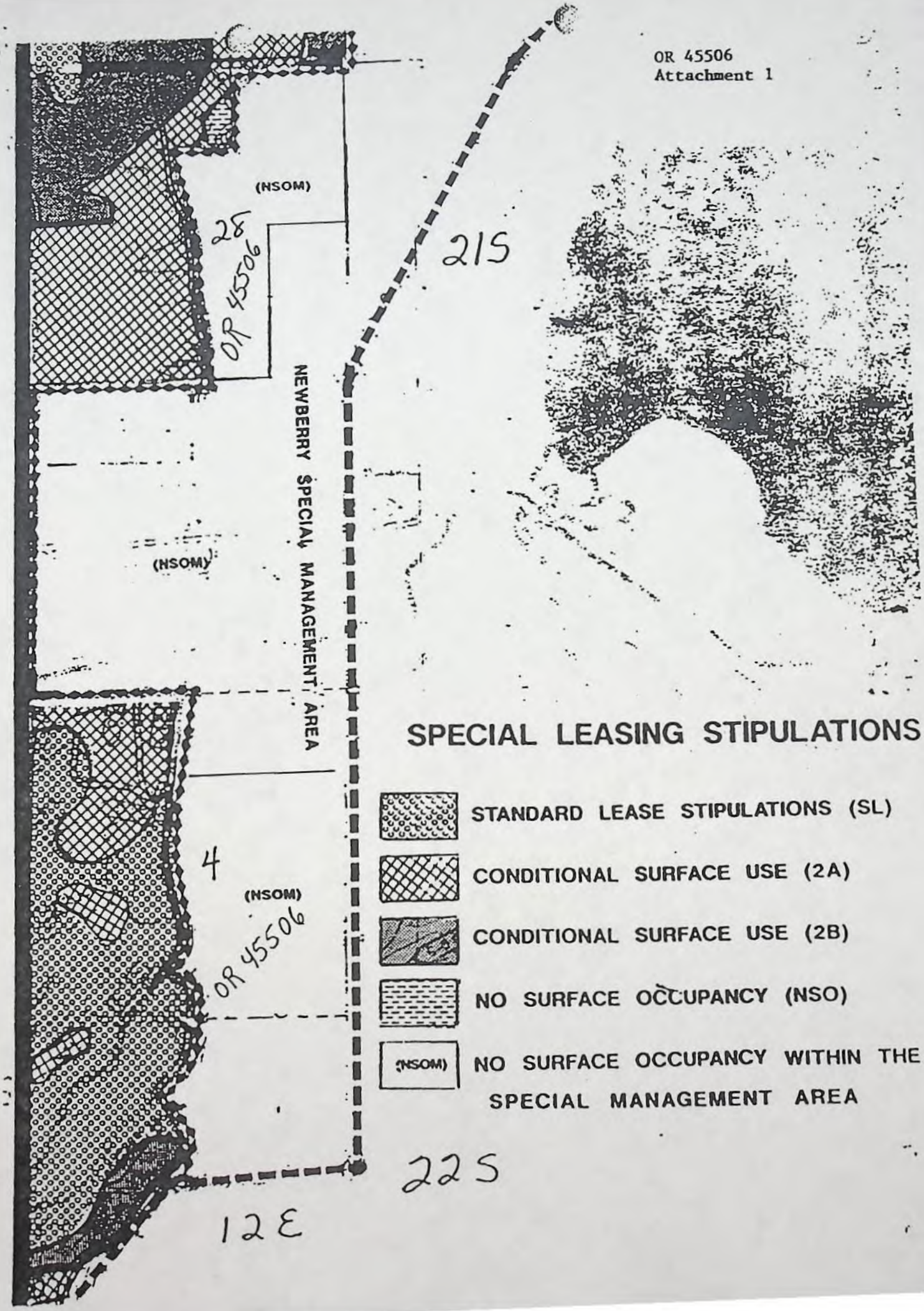
Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

OR 45506
Attachment 1



SPECIAL LEASING STIPULATIONS

- STANDARD LEASE STIPULATIONS (SL)
- CONDITIONAL SURFACE USE (2A)
- CONDITIONAL SURFACE USE (2B)
- NO SURFACE OCCUPANCY (NSO)
- (NSOM) NO SURFACE OCCUPANCY WITHIN THE SPECIAL MANAGEMENT AREA

OR 45506

NOTICE
Deschutes National Forest

1. The Bureau of Land Management (BLM) and the Forest Service have joint responsibility for approval of post lease activities on leases under the Newberry Monument legislation.

Prior to submission of a Plan of Operations for surface disturbing operations, the lessee shall meet with the authorized representative of the Forest Service to be apprised of specific requirements, restrictions, administrative rules and regulations, e.g. timber sales, special use permits, experimental studies, contracts, grazing, other mineral activities, water use and resource closures. This meeting will be waived if the lessee is sufficiently aware of local problems and ground rules of the area involved in the proposed operation.

2. All surface disturbing operations other than "casual use", defined by 43 CFR 3209.0-5(d), must be culturally cleared by the authorized representative of the Forest Service. When the lessee prepares a cultural report to comply with standard lease term No. 6, it must be signed and certified by a qualified archeologist acceptable to the authorized representative of the Forest Service.

3. The leased land may be in an area suitable for the habitat of threatened or endangered plant or animal species. All known viable habitat of these species will be identified for the lessee by the authorized officer of the BLM or the authorized representative of the Forest Service at the preoperational conference or field inspection with recommended mitigation measures. These may include (a) on-site biological and/or botanical surveys by authorities acceptable to the surface manager, (b) avoidance or (c) lessee recommendation of programs that comply with the provisions of the Endangered Species Act of 1973, as amended.

4. No occupancy or other surface disturbance will be allowed on slopes in excess of 50 percent or on designated unstable/very unstable land types without written permission from the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

5. Operations adjacent to any surface water or wet soil areas, such as streams, springs, seeps, reservoirs or meadows, will require a buffer zone. The size will be specifically identified by the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

6. All post leasing activities on areas containing caves will have restrictions to protect the cave formations.

7. Conditional Surface Use areas shown as 2A on Attachment 1 have high visual sensitivity and those shown as 2B have moderate visual sensitivity. Facility siting in the 2A areas may be more difficult than in the 2B areas.

8. Lessees may be required to participate in a long-term monitoring program on their leases.

OR 11987, OR 11992
OR 11994, OR 12004
OR 12007, OR 45506
3220 (943.3)

Due to enactment of the Newberry Volcanic National Monument legislation and in accordance with section 10 of the Geothermal Steam Act of 1970, as amended, the following described lands in the geothermal resources leases listed above are hereby relinquished and issuance of compensatory geothermal resources lease OR 45506 will follow immediately.

RELINQUISHED LANDS

Willamette Meridian, Oregon

T.20 S., R. 12 E.,
Sec. 32, M&B of approximately 435 acres inside the Newberry Volcanic National Monument. (OR 12007)
Sec. 34, all. (OR 12004)

T.21 S., R. 12 E.,
Sec. 2, lots 1, 2, 3, 4, $S\frac{1}{2}N\frac{1}{2}$, $S\frac{1}{2}$. (608 acres in OR11992)
Sec. 9, $E\frac{1}{2}SE\frac{1}{4}$;
Sec. 12, all. (720.00 acres in OR 11987)

T.22 S., R. 13 E.,
Sec.17, M&B of approximately 445 acres inside the Newberry Volcanic National Monument; (OR 11994)

BUREAU OF LAND MANAGEMENT

1992 MAR -2 AM 8:30

OREGON STATE OFFICE
PORTLAND, OR

LANDS IN COMPENSATORY LEASE

Willamette Meridian, Oregon

T. 21 S., R. 12 E.,
Sec. 28, $N\frac{1}{2}$, $SW\frac{1}{4}$, $W\frac{1}{2}SE\frac{1}{4}$.

T. 22 S., R.12 E.,
Sec. 4, approximately 30 acres of lot 3 outside of the Newberry Special Management Area, lot 4, $S\frac{1}{2}N\frac{1}{2}$, $S\frac{1}{2}$ (approximately 1,109.89 in OR 45506-87.22%)

The lessee and the surety remain liable for any lease obligations, excluding the obligation to drill, accrued under the lease terms and conditions up to the date of relinquishment. The lessee agrees to make payment of all accrued rentals and royalties, to place all wells on the relinquished lands in condition for suspension or abandonment and to protect or restore substantially the surface and surface resources.

Philip H. Lesser — 2/26/92

CE EXPLORATION COMPANY, LESSEE — DATE

OR 45506
Exhibit "A"

SPECIAL STIPULATIONS
Newberry National Volcanic Monument
Deschutes National Forest

The lessee shall comply with the following special conditions and stipulations. The stipulations for "Conditional Surface Use" and for "No Surface Occupancy" may be modified by mutual agreement of the lessee, the authorized officer of the Bureau of Land Management and the authorized representative of the United States Department of Agriculture, Forest Service. All of the following are in the Willamette Meridian, Deschutes Co., Oregon.

1. The Secretary of Agriculture shall regulate all surface disturbing activities conducted pursuant to any lease issued under the Newberry Monument legislation and shall determine reclamation and all other actions as required in the interest of conservation of these resources. No permit to drill on a geothermal lease for areas covered under the Newberry Monument legislation may be granted without the analysis and approval by the Secretary of Agriculture of Plans of Operations covering proposed surface disturbing activities within the lease area.

   T. 21 S., R.12 E.,
   Sec. 28, $N\frac{1}{2}$, $SW\frac{1}{4}$, $W\frac{1}{2}SE\frac{1}{4}$;
   T. 22 S., R. 12 E.,
   Sec. 4, approximately 30 acres of lot 3 excluding the Newberry Special Management Area, lot 4, $S\frac{1}{2}N\frac{1}{2}$, $S\frac{1}{2}$.

2. This area is expected to be available for most exploration activities and production facilities. Facility siting restrictions may be applied to protect visual sensitivity. This stipulation may be modified or eliminated if the lessee can demonstrate by appropriate plan of operation to the satisfaction of the Deputy State Director for Mineral Resources, BLM and the authorized representative of the Forest Service that this area will not be adversely affected by the proposed activities.

   T. 21 S., R.12 E., Sec. 28 and T. 22 S., R.12 E.,
   Sec. 4, parts shown on Attachment 1 as Conditional Surface Use (2A and 2B).

3. In order to protect areas with high visual sensitivities the lessee shall not occupy or use the surface of the following described land except for casual use activities as defined in regulation 43 CFR 3209 unless this stipulation is modified or eliminated. Modification or elimination of this stipulation will require evaluation through the NEPA process and may require a change to the Forest Plan.

   T. 21 S., R.12 E.,
   Sec. 28, part shown on Attachment 1 as No Surface Occupancy.

4. In order to protect the Special Management Area, the lessee shall not occupy or use the surface of lands within the Special Management Area. This stipulation cannot be modified or eliminated.

   T. 21 S., R.12 E., Sec. 28 and T. 22 S., R.12 E., Sec. 4,
   those parts shown on Attachment 1 as NSOM Area.

Application No. G-13711

Form 3600-3
(June 1988)

Permit No.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0034
Expires: August 31, 1989

BUREAU OF LAND MANAGEMENT
1991 APR 18 AM 8:30
OREGON STATE OFFICE
PORTLAND, OR

ASSIGNMENT OF RECORD TITLE INTEREST IN A LEASE FOR OIL AND GAS OR GEOTHERMAL RESOURCES

Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)
Act for Acquired Lands of 1947 (30 U.S.C. 351-359)
Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025)
Department of the Interior Appropriations Act, Fiscal Year 1981 (42 U.S.C. 6508)

Lease Serial No.
OR 45505

Lease Effective Date (Anniversary Date)

New Serial No.

Type or print plainly in ink and sign in ink.

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

PART A: ASSIGNMENT

1. Assignee* CE EXPLORATION COMPANY
   Street 601 CALIFORNIA STREET, LAND DEPARTMENT
   City, State, ZIP Code SAN FRANCISCO, CALIFORNIA 94108

*If more than one assignee, check here ☐ and list the name(s) and address(es) of all additional assignees on the reverse of this form or on a separate attached sheet of paper.

This record title assignment is for: *(Check one)* ☐ Oil and Gas Lease, or ☒ Geothermal Lease

Interest conveyed: *(Check one or both, as appropriate)* ☒ Record Title, ☐ Overriding Royalty, payment out of production or other similar interests or payments

2. This assignment conveys the following interest:

Land Description	Percent of Interest			Percent of Overriding Royalty or Similar Interests	
Additional space on reverse, if needed. Do not submit documents or agreements other than this form; such documents or agreements shall only be referenced herein.	Owned	Conveyed	Retained	Reserved	Previously reserved or conveyed
a	b	c	d	e	f
T. 21 S., R. 12 E., Willamette Meridian Sec. 14, NW¼NE¼, NW¼, N½SW¼, SW¼SW¼: Sec. 15, All; Sec. 21, All; Sec. 22, NW¼, W½SW¼. Containing 1,840.00 acres, more or less Deschutes County, Oregon Delta Funds, Inc. has reserved a 0.06% Overriding Royalty Interest in 2.54% of Lease OR 45505, pursuant to that certain letter agreement dated November 19, 1990 between California Energy Company, Inc. and Delta Funds, Inc.	64.91%	64.91%	-0-	-0-	-0-

FOR BLM USE ONLY—DO NOT WRITE BELOW THIS LINE

UNITED STATES OF AMERICA

This assignment is approved solely for administrative purposes. Approval does not warrant that either party to this assignment holds legal or equitable title to this lease.

☒ Assignment approved for above described lands;

☐ Assignment approved for attached land description

Assignment approved effective MAY 1 1991

☐ Assignment approved for land description indicated on reverse of this form.

By _____ Chief, Lands and Minerals Adjudication Section

APR 18 1991

Part A (Continued): ADDITIONAL SPACE for Names and addresses of additional assignees in Item No. 1, if needed, or for Land Description in Item No. 2, if needed.

PART B: CERTIFICATION AND REQUEST FOR APPROVAL

1. The assignor certifies as owner of an interest in the above designated lease that he/she hereby assigns to the above assignee(s) the rights specified above.
2. Assignee certifies as follows: (a) Assignee is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or territory thereof. For the assignment of NPR-A leases, assignee is a citizen, national, or resident alien of the United States or association of such citizens, nationals, resident aliens or private, public or municipal corporations, (b) Assignee is not considered a minor under the laws of the State in which the lands covered by this assignment are located; (c) Assignee's chargeable interests, direct and indirect, in either public domain or acquired lands, do not exceed 200,000 acres in oil and gas options or 246,080 in oil and gas leases in the same State, or 300,000 acres in leases and 200,000 acres in options in each leasing District in Alaska, if this is an oil and gas lease issued in accordance with the Mineral Leasing Act of 1920 or 51,200 acres in any one State if this is a geothermal lease; (d) All parties holding an interest in the assignment are otherwise in compliance with the regulations (43 CFR Group 3100 or 3200) and the authorizing Acts; (e) Assignee is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (f) Assignee is not in violation of sec. 41 of the Mineral Leasing Act.
3. Assignee's signature to this assignment constitutes acceptance of all applicable terms, conditions, stipulations and restrictions pertaining to the lease described herein.

For geothermal assignments, an overriding royalty may not be less than one-fourth (¼) of one percent of the value of output, nor greater than 50 percent of the rate of royalty due to the United States when this assignment is added to all previously created overriding royalties (43 CFR 3241).

I certify that the statements made herein by me are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 10th day of April, 1991

Name of Assignor as shown on current lease: California Energy Company, Inc.
Please type or print

Assignor _____
(Signature)

or Attorney-in-fact Philip H. Essner, Vice President Land
(Signature)

601 California Street
(Assignor's Address)

San Francisco, California 94108
(City) (State) (Zip Code)

Executed this 10th day of April, 1991

CE Exploration Company

Assignee _____
(Signature)

or Attorney-in-fact Philip H. Essner, Vice President Land
(Signature)

Title 18 U.S.C. Sec. 1001 makes it a crime for any per[illegible] knowingly and willfully to make to any Department or ag[illegible] of the United States any false, fictitious or fraudulent statements or representations as to any matter within [illegible] jurisdiction.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1988—673-016/95011

Form 3000-3
(June 1988)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0034
Expires: August 31, 1989

BUREAU OF LAND MANAGEMENT
1991 APR 18 AM 8:30
OREGON STATE OFFICE
PORTLAND, OR

ASSIGNMENT OF RECORD TITLE INTEREST IN A LEASE FOR OIL AND GAS OR GEOTHERMAL RESOURCES

Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)
Act for Acquired Lands of 1947 (30 U.S.C. 351-359)
Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025)
Department of the Interior Appropriations Act, Fiscal Year 1981 (42 U.S.C. 6508)

Lease Serial No.
OR 45505

Lease Effective Date
(Anniversary Date)

New Serial No.

Type or print plainly in ink and sign in ink.

PART A: ASSIGNMENT

1. Assignee* California Energy Company, Inc.
   Street 601 California Street, Land & Permitting Department
   City, State, ZIP Code San Francisco, California 94108

*If more than one assignee, check here ☐ and list the name(s) and address(es) of all additional assignees on the reverse of this form or on a separate attached sheet of paper.

This record title assignment is for: *(Check one)* ☐ Oil and Gas Lease, or ☒ Geothermal Lease

Interest conveyed: *(Check one or both, as appropriate)* ☒ Record Title, ☐ Overriding Royalty, payment out of production or other similar interests or payments

2. This assignment conveys the following interest:

Land Description	Percent of Interest			Percent of Overriding Royalty or Similar Interests	
Additional space on reverse, if needed. Do not submit documents or agreements other than this form; such documents or agreements shall only be referenced herein.	Owned	Conveyed	Retained	Reserved	Previously reserved or conveyed
a	b	c	d	e	f
T. 21 S., R. 12 E., Willamette Meridian Sec. 14, NW¼NE¼, NW¼, N½SW¼, SW¼SW¼; Sec. 15, All; Sec. 21, All; Sec. 22, NW¼, W½SW¼. Containing 1,840.00 acres, more or less Deschutes County, Oregon	2.54%	2.54%	-0-	0.06%	-0-

FOR BLM USE ONLY—DO NOT WRITE BELOW THIS LINE

UNITED STATES OF AMERICA

This assignment is approved solely for administrative purposes. Approval does not warrant that either party to this assignment holds legal or equitable title to this lease.

☒ Assignment approved for above described lands;

☐ Assignment approved for attached land description

Assignment approved effective MAY 1 1991

☐ Assignment approved for land description indicated on reverse of this form.

By [signature]
Chief, Lands and Minerals
Adjudication Section

APR 18 1991

Part A (Continued): ADDITIONAL SPACE for Names and addresses of additional assignees in Item No. 1, if needed, or for Land Description in Item No. 2, if needed.

PART B: CERTIFICATION AND REQUEST FOR APPROVAL

1. The assignor certifies as owner of an interest in the above designated lease that he/she hereby assigns to the above assignee(s) the rights specified above.
2. Assignee certifies as follows: (a) Assignee is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or territory thereof. For the assignment of NPR-A leases, assignee is a citizen, national, or resident alien of the United States or association of such citizens, nationals, resident aliens or private, public or municipal corporations, (b) Assignee is not considered a minor under the laws of the State in which the lands covered by this assignment are located; (c) Assignee's chargeable interests, direct and indirect, in either public domain or acquired lands, do not exceed 200,000 acres in oil and gas options or 246,080 in oil and gas leases in the same State, or 300,000 acres in leases and 200,000 acres in options in each leasing District in Alaska, if this is an oil and gas lease issued in accordance with the Mineral Leasing Act of 1920 or 51,200 acres in any one State if this is a geothermal lease; (d) All parties holding an interest in the assignment are otherwise in compliance with the regulations (43 CFR Group 3100 or 3200) and the authorizing Acts; (e) Assignee is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (f) Assignee is not in violation of sec. 41 of the Mineral Leasing Act.
3. Assignee's signature to this assignment constitutes acceptance of all applicable terms, conditions, stipulations and restrictions pertaining to the lease described herein.

For geothermal assignments, an overriding royalty may not be less than one-fourth (¼) of one percent of the value of output, nor greater than 50 percent of the rate of royalty due to the United States when this assignment is added to all previously created overriding royalties (43 CFR 3241).

I certify that the statements made herein by me are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 10th day of April, 19 91

Name of Assignor as shown on current lease Delta Funds, Inc.
Please type or print

Assignor Delta Funds, Inc. c/o G. W. Moffitt, Jr.
(Signature)
or
Attorney-in-fact George W. Moffitt, Jr.
(Signature)

Three Penn Center Plaza, Suite 823
(Assignor's Address)

Philadelphia, PA 19102
(City) (State) (Zip Code)

Executed this 10th day of April, 19 91

Assignee California Energy Company, Inc.
(Signature)
or
Attorney-in-fact Philip H. Essner
(Signature)

Philip H. Essner
Vice President Land
Land & Permitting Department

Title 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1988—673-016/95011

Form 3200-24
(November 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OBM NO. 1004-0038
Expires January 31, 1986

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. OR 45505

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

Read Instructions Before Completing

1. Name	CE Exploration Co 64.91% c/o California Energy Company, Inc. (~~62.37%~~)	~~Delta Funds, Inc. (2.54%)~~ 0% c/o G. W. Moffitt, Jr.	Christian F. Murer (35.09%)
Street	601 California Street, Suite 900	Roberts Road & Bethel Lane	1645 Court Plaza, Suite 201
City, State, Zip Code	San Francisco, CA 94108	Bryn Mawr, PA 19010	Denver, CO 80202

2. Surface managing agency if other than BLM: USDA, FS Unit/Project

Legal description of land requested (segregate by public domain and acquired lands):

T. 21 S., R. 12 E., Meridian Willamette State Oregon County Deschutes

Sec. 14, NW¼NE¼, NW¼, N½SW¼, SW¼SW¼;
Sec. 15, All;
Sec. 21, All;
Sec. 22, NW¼, W½SW¼.

BUREAU OF LAND MANAGEMENT
1991 APR 18 AM 8 30
OREGON STATE OFFICE
PORTLAND, OR

Total acres applied for 1,840.00

Percent U.S. interest 100%

Amount remitted: Filing fee $ 0 Rental fee $ ~~3,680.00~~ Total $ ~~3,680.00~~

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

Same as Item 2.

Total acres in lease 1,840.00

Rental retained $ 3,680.00

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

THE UNITED STATES OF AMERICA

by _____ (Signing Officer)

Chief, Lands and Minerals Adjudication Section (Title)

APR 18 1991 (Date)

Type of lease:

☐ Noncompetitive

☐ Competitive

☒ Other Compensatory (P.L. 101-522) 104 Stat. 2288

EFFECTIVE DATE OF LEASE MAY 1 1991

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 10th day of April, 19 91. Philip H. Lesser

(Signature of Lessee or Attorney-in-fact)

Signature Page 1

Subject to additional stipulations attached. See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: $1 for noncompetitive leases and $2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unneccessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

BUREAU OF LAND MANAGEMENT

1991 APR 18 AM 3:30

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 10th day of April, 1991.

George W. Moffitt Jr.
President
(Signature of Lessee or Attorney-in-fact)

Signature Page X 2

Subject to additional stipulations attached. See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: $1 for noncompetitive leases and $2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 13th day of March, 19 91.

(Signature of Lessee or Attorney-in-fact)

Signature Page 3

Subject to additional stipulations attached. See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: $1 for noncompetitive leases and $2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unneccessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

OR 45505
Exhibit "A"

SPECIAL STIPULATIONS
Newberry National Volcanic Monument
Deschutes National Forest

The lessee shall comply with the following special conditions and stipulations. The stipulations for "Conditional Surface Use" and for "No Surface Occupancy" may be modified by mutual agreement of the lessee, the authorized officer of the Bureau of Land Management and the authorized representative of the United States Department of Agriculture, Forest Service.

1. The Secretary of Agriculture shall regulate all surface disturbing activities conducted pursuant to any lease issued under the Newberry Monument legislation and shall determine reclamation and all other actions as required in the interest of conservation of these resources. No permit to drill on a geothermal lease for areas covered under the Newberry Monument legislation may be granted without the analysis and approval by the Secretary of Agriculture of Plans of Operations covering proposed surface disturbing activities within the lease area.

   Willamette Meridian, Oregon
   T. 21 S., R.12 E.,
   Sec. 14, $NW\frac{1}{4}NE\frac{1}{4}$, $NW\frac{1}{4}$, $N\frac{1}{2}SW\frac{1}{4}$, $SW\frac{1}{4}SW\frac{1}{4}$;
   Sec. 15 and Sec. 21, all;
   Sec. 22, $NW\frac{1}{4}$, $W\frac{1}{2}SW\frac{1}{4}$.

2. This area is expected to be available for most exploration activities and production facilities. Facility siting restrictions may be applied to protect visual sensitivity. This stipulation may be modified or eliminated if the lessee can demonstrate by appropriate plan of operation to the satisfaction of the Deputy State Director for Mineral Resources, BLM and the authorized representative of the Forest Service that this area will not be adversely affected by the proposed activities.

   Willamette Meridian, Oregon
   T. 21 S., R.12 E.,
   Secs. 14, 15, 21 and 22, those parts shown on Attachment 1 as Conditional Surface Use (2A and 2B).

3. In order to protect areas with high visual sensitivities the lessee shall not occupy or use the surface of the following described land except for casual use activities as defined in regulation 43 CFR 3209 unless this stipulation is modified or eliminated. Modification or elimination of this stipulation will require evaluation through the NEPA process and may require a change to the Forest Plan.

   Willamette Meridian, Oregon
   T. 21 S., R.12 E.,
   Secs. 14, 15, 21 and 22, those parts shown on Attachment 1 as No Surface Occupancy.

4. In order to protect the Special Management Area, the lessee shall not occupy or use the surface of lands within the Special Management Area. This stipulation cannot be modified or eliminated.

   Willamette Meridian, Oregon
   T. 21 S., R.12 E.,
   Secs. 14, 15 and 22, those parts shown on Attachment 1 as No Surface Occupancy Within the Special Management Area.

ATTACHMENT 1

SPECIAL LEASING STIPULATIONS

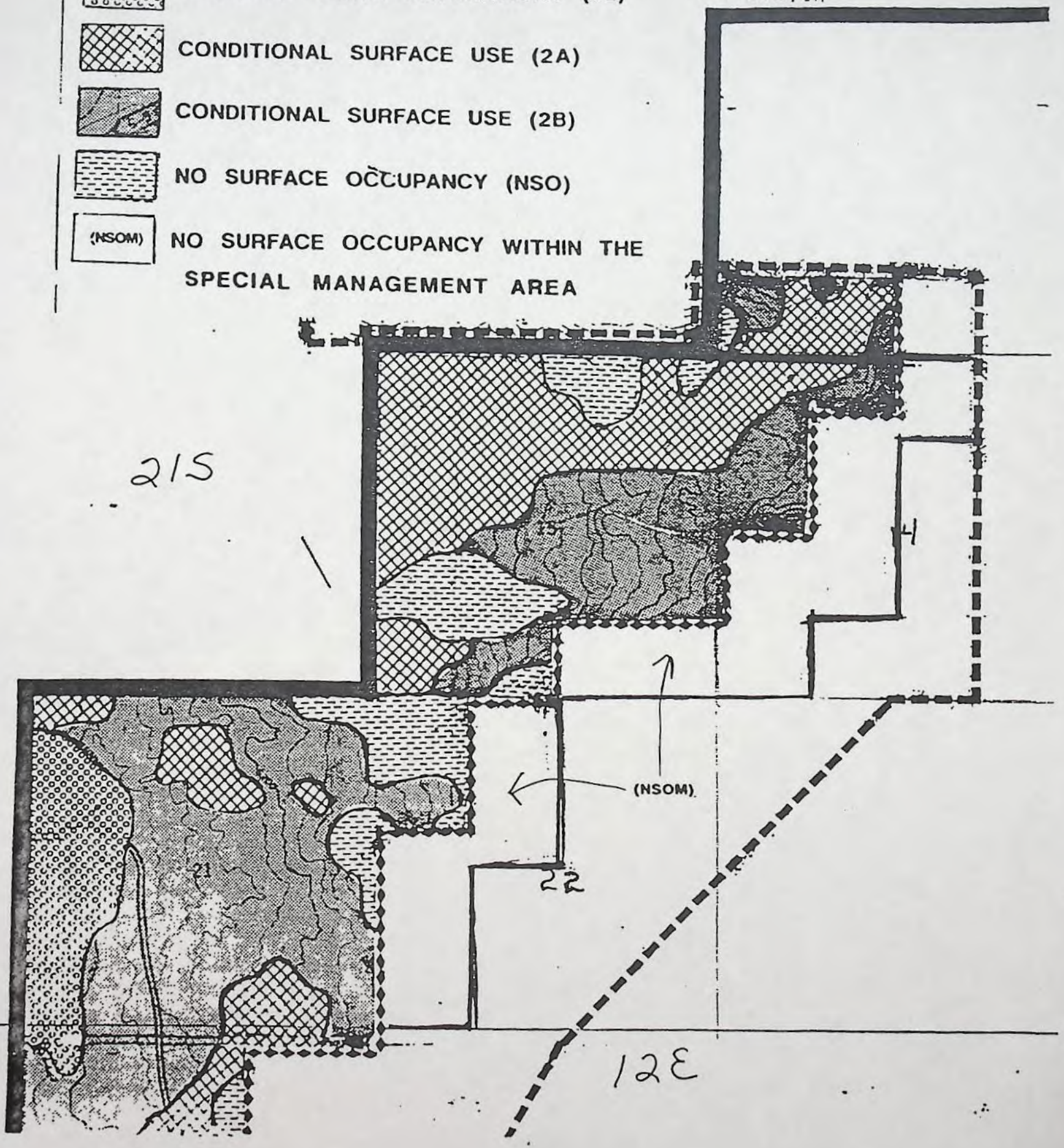
STANDARD LEASE STIPULATIONS (SL)

CONDITIONAL SURFACE USE (2A)

CONDITIONAL SURFACE USE (2B)

NO SURFACE OCCUPANCY (NSO)

(NSOM) NO SURFACE OCCUPANCY WITHIN THE SPECIAL MANAGEMENT AREA



NOTICE
Deschutes National Forest

1. The Bureau of Land Management (BLM) and the Forest Service have joint responsibility for approval of post lease activities on leases under the Newberry Monument legislation.

Prior to submission of a Plan of Operations for surface disturbing operations, the lessee shall meet with the authorized representative of the Forest Service to be apprised of specific requirements, restrictions, administrative rules and regulations, e.g. timber sales, special use permits, experimental studies, contracts, grazing, other mineral activities, water use and resource closures. This meeting will be waived if the lessee is sufficiently aware of local problems and ground rules of the area involved in the proposed operation.

2. All surface disturbing operations other than "casual use", defined by 43 CFR 3209.0-5(d), must be culturally cleared by the authorized representative of the Forest Service. When the lessee prepares a cultural report to comply with standard lease term No. 6, it must be signed and certified by a qualified archeologist acceptable to the authorized representative of the Forest Service.

3. The leased land may be in an area suitable for the habitat of threatened or endangered plant or animal species. All known viable habitat of these species will be identified for the lessee by the authorized officer of the BLM or the authorized representative of the Forest Service at the preoperational conference or field inspection with recommended mitigation measures. These may include (a) on-site biological and/or botanical surveys by authorities acceptable to the surface manager, (b) avoidance or (c) lessee recommendation of programs that comply with the provisions of the Endangered Species Act of 1973, as amended.

4. No occupancy or other surface disturbance will be allowed on slopes in excess of 50 percent or on designated unstable/very unstable land types without written permission from the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

5. Operations adjacent to any surface water or wet soil areas, such as streams, springs, seeps, reservoirs or meadows, will require a buffer zone. The size will be specifically identified by the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

6. All post leasing activities on areas containing caves will have restrictions to protect the cave formations.

7. Conditional Surface Use areas shown as 2A on Attachment 1 have high visual sensitivity and those shown as 2B have moderate visual sensitivity. Facility siting in the 2A areas may be more difficult than in the 2B areas.

8. Lessees may be required to participate in a long-term monitoring program on their leases.

Application No. G-13711
Permit No.

Form 3000-3
(June 1988)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0034
Expires: August 31, 1989

BUREAU OF LAND MANAGEMENT
'93 MAR 14 AM 9 30
OREGON STATE OFFICE
PORTLAND, OR

ASSIGNMENT OF RECORD TITLE INTEREST IN A LEASE FOR OIL AND GAS OR GEOTHERMAL RESOURCES

Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)
Act for Acquired Lands of 1947 (30 U.S.C. 351-359)
Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025)
Department of the Interior Appropriations Act, Fiscal Year 1981 (42 U.S.C. 6508)

Lease Serial No.
OR 11992

Lease Effective Date
(Anniversary Date)
May 1, 1983

New Serial No.

Type or print plainly in ink and sign in ink.

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

PART A: ASSIGNMENT

1. Assignee* CE Exploration Company
   Street C/O California Energy Company, Inc.
   City, State, ZIP Code 601 California Street, Land & Permitting Department
   San Francisco, CA 94108

*If more than one assignee, check here ☐ and list the name(s) and address(es) of all additional assignees on the reverse of this form or on a separate attached sheet of paper.

This record title assignment is for: *(Check one)* ☐ Oil and Gas Lease, or ☒ Geothermal Lease

Interest conveyed: *(Check one or both, as appropriate)* ☒ Record Title, ☐ Overriding Royalty, payment out of production or other similar interests or payments

2. This assignment conveys the following interest:

Land Description	Percent of Interest			Percent of Overriding Royalty or Similar Interests	
Additional space on reverse, if needed. Do not submit documents or agreements other than this form; such documents or agreements shall only be referenced herein.	Owned	Conveyed	Retained	Reserved	Previously reserved or conveyed
a	b	c	d	e	f
T. 21 S., R. 12 E., Willamette Meridian Sec. 2: All Sec. 20: All Containing 1248.00 acres, more or less Deschutes County, Oregon	100%	100%	-0-	2.5%	-0-

George W. Waters will acquire a 1.62% Overriding Royalty Interest in Lease OR 45506, pursuant to that certain letter-agreement, dated December 14, 1990 between CE Exploration Company and George W. Waters.

FOR BLM USE ONLY—DO NOT WRITE BELOW THIS LINE

UNITED STATES OF AMERICA

This assignment is approved solely for administrative purposes. Approval does not warrant that either party to this assignment holds legal or equitable title to this lease.

☒ Assignment approved for above described lands;

☐ Assignment approved for attached land description

Assignment approved effective APR 1 1991

☐ Assignment approved for land description indicated on reverse of this form.

By _____

Chief, Lands and Minerals
Adjudication Section

MAY 10 1991

Part A (Continued): ADDITIONAL SPACE for Names and addresses of additional assignees in Item No. 1, if needed, or for Land Description in Item No. 2, if needed.

PART B: CERTIFICATION AND REQUEST FOR APPROVAL

1. The assignor certifies as owner of an interest in the above designated lease that he/she hereby assigns to the above assignee(s) the rights specified above.
2. Assignee certifies as follows: (a) Assignee is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or territory thereof. For the assignment of NPR-A leases, assignee is a citizen, national, or resident alien of the United States or association of such citizens, nationals, resident aliens or private, public or municipal corporations, (b) Assignee is not considered a minor under the laws of the State in which the lands covered by this assignment are located; (c) Assignee's chargeable interests, direct and indirect, in either public domain or acquired lands, do not exceed 200,000 acres in oil and gas options or 246,080 in oil and gas leases in the same State, or 300,000 acres in leases and 200,000 acres in options in each leasing District in Alaska, if this is an oil and gas lease issued in accordance with the Mineral Leasing Act of 1920 or 51,200 acres in any one State if this is a geothermal lease; (d) All parties holding an interest in the assignment are otherwise in compliance with the regulations (43 CFR Group 3100 or 3200) and the authorizing Acts; (e) Assignee is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (f) Assignee is not in violation of sec. 41 of the Mineral Leasing Act.
3. Assignee's signature to this assignment constitutes acceptance of all applicable terms, conditions, stipulations and restrictions pertaining to the lease described herein.

For geothermal assignments, an overriding royalty may not be less than one-fourth (¼) of one percent of the value of output, nor greater than 50 percent of the rate of royalty due to the United States when this assignment is added to all previously created overriding royalties (43 CFR 3241).

I certify that the statements made herein by me are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 19 day of December, 19 90

Name of Assignor as shown on current lease George W. Waters
Please type or print

Assignor George W. Waters

(Signature)

72 Pine Cove Road
(Assignor's Address)

Fair Haven, NJ 07701
(City) (State) (Zip Code)

Executed this 13 day of March, 19 91

Assignee CE Exploration Company

Philip H. Essner
Vice-President
Land & Permitting Department

Title 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1988—673-016/95011

Form 3200–21
(May 1974)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

GEOTHERMAL RESOURCES LEASE
☐ Competitive ☒ Noncompetitive

Serial Number OR 11992
USGS – KGRA Determination:

In consideration of the terms and conditions contained herein, and the grant made hereby, this lease is entered into by the UNITED STATES OF AMERICA (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and

George W. Waters
72 Pine Cove Rd.
Fair Haven, NJ 07701

(hereinafter called the "Lessee").

This lease is made pursuant to the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001–1025) (hereinafter called "the Act") to be effective on (hereinafter called the "effective date"). It is subject to all the provisions of the Act and to all the terms, conditions, and requirements of (a) all regulations promulgated by the Secretary of the Interior (hereinafter called "the Secretary") in existence upon the effective date, specifically including, but not limited to, 43 CFR Parts 3000 and 3200 and 30 CFR Parts 270 and 271, (b) all geothermal resources operational orders (hereinafter called "GRO orders") issued pursuant thereto, all of which are incorporated herein and by reference made a part hereof, and (c) any regulations hereafter issued by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference) all of which shall be, upon their effective date, incorporated herein and, by reference, made a part hereof.

Sec. 1. GRANT – The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources, (hereinafter called "geothermal resources"), in or under the following described lands situated within the County of Deschutes, State of Oregon:

National Resource Lands	Acquired Lands
T. 21 S. ; R. 12 E. ; Willamette Meridian	T. ; R. ; Meridian
Sec. 2: All; Sec. 20: All.	
Total Area 1248.00 acres	Total Area

Containing 1248.00 acres (hereinafter called the "leased area" or "leased lands"), together with:

(a) The nonexclusive right to conduct within the leased area geological and geophysical exploration in accordance with applicable regulations; and

(b) The right to construct or erect and to use, operate, and maintain within the leased area, together with ingress and egress thereupon all wells, pumps, pipes, pipelines, buildings, plants, sumps, brine pits, reservoirs, tanks, waterworks, pumping stations, roads, electric power generating plants, transmission lines, industrial facilities, electric, telegraph or telephone lines, and such other works and structures and to use so much of the surface of the land as may be necessary or reasonably convenient for the production, utilization, and processing of geothermal resources or to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations; *Provided that*, although the use of the leased area for an electric power generating plant or transmission facilities or a commercial or industrial facility is authorized hereunder, the location of such facilities and the terms of occupancy therefor shall be under separate instruments issued under any applicable laws and regulations; and

(c) The nonexclusive right to drill potable water wells in accordance with state water laws within the leased area and to use the water produced therefrom for operations on the leased lands free of cost, provided that such drilling and development are conducted in accordance with procedures approved by the Supervisor of the Geological Survey (hereinafter called "Supervisor"); and

(d) The right to convert this lease to a mineral lease under the Mineral Leasing Act of February 25, 1920, as amended, and supplemented (30 U.S.C. 181–287) or under the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351–359), whichever is appropriate, if the leasehold is primarily valuable for the production of one or more valuable by-products which are leasable under those statutes, and the lease is incapable of commercial production or utilization of geothermal steam: *Provided that*, an application is made therefor prior to the expiration of the lease extension by reason of by-product production as hereinafter provided, and subject to all the terms and conditions of said appropriate Acts. The Lessee is also granted the right to locate mineral deposits under the mining laws (30 U.S.C. 21–54), which would constitute by-products if commercial production or utilization of geothermal steam continued, but such a location to be valid must be completed within ninety (90) days after the termination of this lease. Any conversion of this lease to a mineral lease or a mining claim is contingent on the availability of such lands for

Application No. G-1374
Permit No.

OR 11992
Exhibit "A"

Special Stipulations
Deschutes National Forest

The Lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee, Authorized Officer, Supervisor and the responsible surface management official. (In addition to the definition found in Section 5 of this lease document and as defined in the regulations under 43 CFR 3000.0-5(f), the term "Authorized Officer" as used in this lease for the lands whose surface is managed by an agency other than the Bureau of Land Management is: (a) for sections 5 and 11, the Authorized Officer of the Bureau of Land Management; (b) for sections 12, 14, and 18 involving surface management responsiblities, the authorized representative of the United States Department of Agriculture Forest Service.)

1. All surface disturbing operations, other than "casual use" as defined by 43 CFR 3209.0-2(d), must be culturally cleared by the responsible surface management official. When a lessee cultural report is necessary to comply with standard lease term No. 18, it must be signed and certified by a qualified archaeologist acceptable to the responsible surface management official.

2. The Lessee shall make every possible effort to prevent, control and suppress any fire on federally owned or managed lands or near the lease operational site. All uncontrolled fires shall be immediately reported to Central Dispatch (503) 947-3885.

3. Prior to submission of a plan of operation for surface disturbing operations, the Lessee shall meet with the appropriate surface management agency representatives, to be appraised of specific requirements, restrictions, administrative rules and regulations, e.g., outstanding rights. This meeting may be waived if the Lessee is sufficiently aware of local problems and ground rules of the area involved in the proposed operation.

4. In order to protect a geologic special interest area, the Lessee agrees not to occupy or use the surface of the following described lands until this stipulation is modified or eliminated.

Willamette Meridian, Oregon
T. 21 S., R. 12 E.,
Sec. 2, part of the W½.
(See Attachment 1)

Oregon

WATER
RESOURCES
DEPARTMENT

November 15, 1994

Dorl File with Martha Letters

Senator Neil R. Bryant
PO Box 1151
Bend OR 97709

RE: California Energy Exploration Company Application G-13711

Dear Senator Bryant:

Thank you for your inquiry on the above referenced application.

This application was filed with the Department on June 6, 1994, and proposes to use up to 1600 gallons per minute from six wells for uses related to geothermal power production. All of the proposed wells lie within the Deschutes Basin.

Our Groundwater\Hydrology Section will complete an analysis to determine if use from the well would have the potential for substantial interference with the nearest surface water source. Once this is completed, the next step will be to issue a report of technical review. It would be optimistic to say that a technical review could be completed before April 1, 1995. Determining surface water availability along with groundwater uses within or above state scenic waterways makes the Deschutes Basin a tough one for us to work in. However, we are making progress and hope to have the average pendency time from application to technical review down to eight months by July 1, 1995.

Once a technical review is issued there will be a 60-day objection period. If no objections are received on a satisfactory technical review a permit can be issued within a few weeks. If objections are received, issuing a permit can take much longer.

If you have any questions, please do not hesitate to give me a call.

Sincerely,

Martha

Martha O. Pagel
Director

MOP:ex.dwf.256

Commerce Building
158 12th Street NE
Salem, OR 97310-0210
(503) 378-3739
FAX (503) 378-

NEIL R. BRYANT
DESCHUTES, JEFFERSON, WASCO & KLAMATH COUNTIES
DISTRICT 27

REPLY TO ADDRESS INDICATED:
☐ Senate Chamber
Salem, OR 97310
☒ P.O. Box 1151
Bend, OR 97709
(503) 382-4331

OREGON STATE SENATE
SALEM, OREGON
97310

November 11, 1994

Martha Pagel
Director
Water Resources Department
158 12th Street, N.E.
Salem, OR 97310

Re: California Energy Exploration Company Application G-13711

Dear Ms. Pagel:

I am on an advisory committee concerning the Newberry Geothermal Project in Deschutes County. I would appreciate an update on the above-referenced application. The test wells for the project will be drilled this spring. It is important that the application be timely processed. I am not sure, but I do not think they are technically within the Deschutes Basin.

Sincerely,

Neil Bryant

Neil R. Bryant

NRB:kas

November 2, 1994

M. Margaret Pagel, Director
Oregon Water Resources Department
Applications and Permits Section
158 12th Street NW
Salem, Oregon 97310

RE: Application # G-13711

Dear M. Pagel:

California Energy Exploration Company ("CEE") applied for a groundwater permit on June 3, 1994 for water wells needed in conjunction with the Newberry Geothermal Project in Deschutes County. Power from the project will be sold to the Eugene Water and Electric Board ("EWEB") and the Bonneville Power Administration ("BPA"). The project will be developed by CEE and EWEB on U.S. Forest Service land. The Newberry Project is a BPA pilot project to demonstrate the feasibility of geothermal power development in the Pacific Northwest in accordance with the Northwest Power Planning Council's call for development of renewable energy resources.

CE Exploration Company has applied for groundwater rights (Application # G-13711) for 1600 gallons per minute to support the Newberry Geothermal Pilot Project. Subsequent to our application, the BPA, US Forest Service and the Bureau of Land Management have approved a comprehensive Environmental Impact Statement for the project. I have enclosed for the application file the following information from the approved Environmental Impact Statement.

1) Record of Decision for the Environmental Impact Statement.
2) Table of Contents from the Environmental Impact Statement.
3) Hydrology Sections of the Environmental Impact Statement.
4) The Hydrology Baseline Report for the Environmental Impact Statement prepared by Dames and Moore.

CEE plans to drill production wells during the summer of 1995 and if sufficient resources are found, power plant construction will begin in October 1995. A request for expedited processing will be submitted soon to the Energy Facility Siting Council so that a site certificate can be issued on or before October 1, 1995.

The Newberry Project is an important part of BPA's regional commitment to renewable energy resources. Power from the project is needed in 1997 to meet local and regional power needs. The BPA and EWEB have signed power supply contracts with the target of power delivery being October, 1997. The public interest and need

CE EXPLORATION COMPANY
34 N.W. FIRST AVENUE, SUITE 302, PORTLAND, OR 97209 (503) 226-3636 FAX: (503) 226-7695

for renewable energy resources like that at Newberry is evidenced in the Northwest Power Plan itself and the records of decisions issued by all involved federal agencies. The legislature provided for expedited processing of site certificates for renewable energy projects of this size, requiring the Energy Facility Siting Council to act on site certificate applications within 6 months.

The Newberry Project needs water to drill the production wells and ultimately will need water for the power plant itself. I was extremely concerned when I was told yesterday that the Water Resources Department has placed an informal moratorium on processing water rights applications in the entire Deschutes Basin. The reason given for the moratorium was the need to complete the groundwater study now underway by your department and the U.S. Geological Survey ("USGS"). It does not make sense to delay issuance of a technical report on the Newberry Project applications for completion of the Lower Deschutes Basin study since the study does not even cover the area where the project will be located. Please note that the enclosed Hydrology Baseline Report by Dames and Moore is both a regional and a site specific study. The study area covers 200 square miles with focus on the upper Deschutes River Basin and Newberry Volcano. The Environmental Impact Statement and the Dames and Moore study examine both the local and regional impacts on the ground water hydrology of the study area. The Record of Decision document also provides approval stipulations for hydrology monitoring and protection of shallow aquifers. We believe this information will be useful to the Department in the development of the Technical Report on Application G-13711.

This project is scheduled to begin drilling and development in March, 1995. Given the public interest in this project, CEE and EWEB request that you direct your staff to prepare the technical report on CEE's application as soon as possible, rather than waiting for completion of the unrelated groundwater study being done by the department and USGS. To assure timely permit issuance and effective interagency coordination, we would like to meet with you as soon as possible to agree upon a schedule for issuance of the technical report and further processing of our application. Please call me at (503) 226-3636 if you have any questions.

Sincerely,

David W. McClain

David W. McClain
Project Manager

Enclosures: 4
cc: Don Hull, ODGMI
Alix Sifford, ODOE
Dennis Davis, BLM
Ken Beeson, EWEB
George Darr, BPA
cc's are without attachments

Application No. G 13711

Permit No.

Form 3200-24
(November 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OBM NO. 1004-0038
Expires January 31, 1986

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. OR 47302

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

BUREAU OF LAND MANAGEMENT
1991 JUL 29 AM 8:30
OREGON STATE OFFICE
PORTLAND, OR

Read Instructions Before Completing

1. Name: CE Exploration Co.
   c/o California Energy Co., Inc.
   Street: Land and Permitting Dept.
   601 California St.
   City, State, Zip Code: San Francisco, CA 94108

2. Surface managing agency if other than BLM: USDA, FS Unit/Project: Leasing Unit 5

Legal description of land requested (segregate by public domain and acquired lands):

T. 22 S., R. 12 E., Meridian Willamette State Oregon County Deschutes

Sec. 9, that part outside of the Newberry National Volcanic Monument;
Sec. 10, that part of the S½SW¼ outside of the Newberry National Volcanic Monument.

Total acres applied for 406.00
Percent U.S. interest 100%
Amount remitted: Filing fee $ 0 Rental fee $ 812.00 Total $ 812.00

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

Same as Item 2

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

Total acres in lease 406.00
Rental retained $ 812.00

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

Lease is subject to attached Stipulations, Exhibit "A"

Type of lease:
- ☐ Noncompetitive
- ☒ Competitive
- ☐ Other

THE UNITED STATES OF AMERICA

by [signature] (Signing Officer)

Chief, Lands and Minerals Adjudication Section (Title)

JUL 31 1991 (Date)

EFFECTIVE DATE OF LEASE AUG 1 1991

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 23 day of July, 19 91. [signature] V.P. LAND

(Signature of Lessee or Attorney-in-fact)

Subject to additional stipulations attached, See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: $1 for noncompetitive leases and $2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unneccessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

OR 47302
Exhibit "A"

SPECIAL STIPULATIONS
Newberry Caldera KGRA - Unit 5
Deschutes National Forest

The lessee shall comply with the following special conditions and stipulations. The stipulations for "Conditional Surface Use" and for "No Surface Occupancy" may be modified by mutual agreement of the lessee, the authorized officer of the Bureau of Land Management and the authorized representative of the United States Department of Agriculture, Forest Service. All lands are in the Willamette Meridian, Deschutes County, Oregon.

1. The Secretary of Agriculture shall regulate all surface disturbing activities conducted pursuant to any lease issued under the Newberry Monument legislation and shall determine reclamation and all other actions as required in the interest of conservation of these resources. No permit to drill on a geothermal lease for areas covered under the Newberry National Volcanic Monument legislation may be granted without the analysis and approval by the Secretary of Agriculture of Plans of Operations covering proposed surface disturbing activities within the lease area.

   T. 21 S., R.12 E.,
   Secs. 9 and 10, that area shown on Attachment 1 as SL.

2. This area is expected to be available for most exploration activities and production facilities. Facility siting restrictions may be applied to protect visual sensitivity. This stipulation may be modified or eliminated if the lessee can demonstrate by appropriate plan of operation to the satisfaction of the Deputy State Director for Mineral Resources, BLM and the authorized representative of the Forest Service that this area will not be adversely affected by the proposed activities.

   T. 21 S., R.12 E.,
   Sec. 9, that area shown on Attachment 1 as 2A and 2B.

3. In order to protect the Special Management Area, the lessee shall not occupy or use the surface of lands within the Special Management Area. This stipulation cannot be modified or eliminated.

   T. 21 S., R.12 E.,
   Sec. 9, that area shown on Attachment 1 as NSOM.

OR 47302

NOTICE
Newberry Caldera KGRA
Deschutes National Forest

The Bureau of Land Management (BLM) and the Forest Service have joint responsibility for approval of post lease activities on leases under the Newberry Monument legislation.

1. Prior to submission of a Plan of Operations for surface disturbing operations, the lessee shall meet with the authorized representative of the Forest Service to be apprised of specific requirements, restrictions, administrative rules and regulations, e.g. timber sales, special use permits, experimental studies, contracts, grazing, other mineral activities, water use and resource closures. This meeting will be waived if the lessee is sufficiently aware of local problems and ground rules of the area involved in the proposed operation.

2. All surface disturbing operations other than "casual use", defined by 43 CFR 3209.0-5(d), must be culturally cleared by the authorized representative of the Forest Service. When the lessee prepares a cultural report to comply with standard lease term No. 6, it must be signed and certified by a qualified archeologist acceptable to the authorized representative of the Forest Service.

3. The leased land may be in an area suitable for the habitat of threatened or endangered plant or animal species. All known viable habitat of these species will be identified for the lessee by the authorized officer of the BLM or the authorized representative of the Forest Service at the preoperational conference or field inspection with recommended mitigation measures. These may include (a) on-site biological and/or botanical surveys by authorities acceptable to the surface manager, (b) avoidance or (c) lessee recommendation of programs that comply with the provisions of the Endangered Species Act of 1973, as amended.

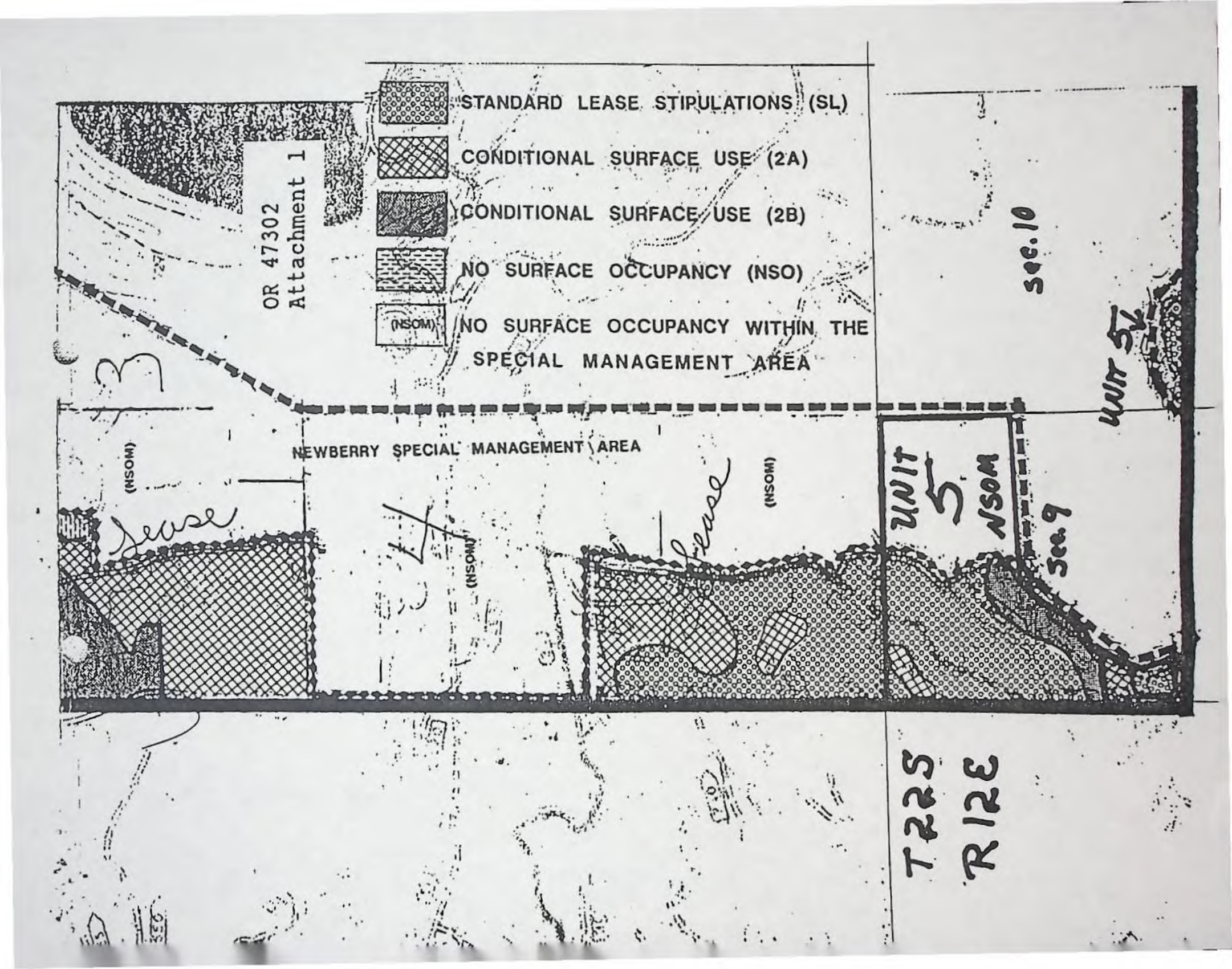
4. No occupancy or other surface disturbance will be allowed on slopes in excess of 50 percent or on designated unstable/very unstable land types without written permission from the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

5. Operations adjacent to any surface water or wet soil areas, such as streams, springs, seeps, reservoirs or meadows, will require a buffer zone. The size will be specifically identified by the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

6. All post leasing activities on areas containing caves will have restrictions to protect the cave formations.

7. Conditional Surface Use areas shown as 2A on Attachment 1 have high visual sensitivity and those shown as 2B have moderate visual sensitivity. Facility siting in the 2A areas may be more difficult than in the 2B areas.

8. Lessees may be required to participate in a long-term monitoring program on their leases.


STANDARD LEASE STIPULATIONS (SL)
CONDITIONAL SURFACE USE (2A)
CONDITIONAL SURFACE USE (2B)
NO SURFACE OCCUPANCY (NSO)
(NSOM) NO SURFACE OCCUPANCY WITHIN THE SPECIAL MANAGEMENT AREA
OR 47302 Attachment 1
NEWBERRY SPECIAL MANAGEMENT AREA
(NSOM)
Lease
Sec. 10
Sec. 9
UNIT
T22S
R12E

Application No. 67371

Form 3200-24
(November 1984)

Permit No.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OBM NO. 1004-0038
Expires January 31, 1986

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. OR 47297

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

Read Instructions Before Completing

BUREAU OF LAND MANAGEMENT

1991 JUL 29 AM 8 30

OREGON STATE OFFICE
PORTLAND, OR

1. Name: CE Exploration Co.
   c/o California Energy Co., Inc.
   Street: Land and Permitting Dept.
   601 California St.
   City, State, Zip Code: San Francisco, CA 94108

2. Surface managing agency if other than BLM: USDA, FS Unit/Project: Leasing Unit 1

Legal description of land requested (segregate by public domain and acquired lands):

T. 21 S., R. 12 E., Meridian Willamette State Oregon County Deschutes

Sec. 11, S½SW¼, SW¼SE¼.

RECEIVED
JUN 10 1994
WATER RESOURCES DEPT.
SALEM, OREGON

Total acres applied for 120.00
Percent U.S. interest 100%
Amount remitted: Filing fee $ 0 Rental fee $ 240.00 Total $ 240.00

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T.	R.	Meridian	State	County
Same as Item 2				

Total acres in lease 120.00
Rental retained $ 240.00

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

Lease is subject to attached Stipulations, Exhibit "A"

Type of lease:
- ☐ Noncompetitive
- ☒ Competitive
- ☐ Other

THE UNITED STATES OF AMERICA

by _____ (Signing Officer)

Chief, Lands and Minerals Adjudication Section (Title)

JUL 31 1991 (Date)

EFFECTIVE DATE OF LEASE AUG 1 1991

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

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

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

Duly executed this 23 day of July, 19 91. [signature] V. P. Land

(Signature of Lessee or Attorney-in-fact)

Subject to additional stipulations attached. See Exhibit "A"

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: $1 for noncompetitive leases and $2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than $2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unneccessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

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

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

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

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

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

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

OR 47297
Exhibit "A"

SPECIAL STIPULATIONS
Newberry Caldera KGRA - Unit 1
Deschutes National Forest

The lessee shall comply with the following special conditions and stipulations. The stipulations for "Conditional Surface Use" and for "No Surface Occupancy" may be modified by mutual agreement of the lessee, the authorized officer of the Bureau of Land Management and the authorized representative of the United States Department of Agriculture, Forest Service. All lands are in the Willamette Meridian, Deschutes County, Oregon.

1. This area is expected to be available for most exploration activities and production facilities. Facility siting restrictions may be applied to protect visual sensitivity. This stipulation may be modified or eliminated if the lessee can demonstrate by appropriate plan of operation to the satisfaction of the Deputy State Director for Mineral Resources, BLM and the authorized representative of the Forest Service that this area will not be adversely affected by the proposed activities.

   T. 21 S., R.12 E.,
   Sec. 11, part of the $S\frac{1}{2}S\frac{1}{2}$ shown on Attachment 1 as 2A & 2B.

2. In order to protect areas with high visual sensitivities the lessee shall not occupy or use the surface of the following described land except for casual use activities as defined in regulation 43 CFR 3209 unless this stipulation is modified or eliminated. Modification or elimination of this stipulation will require evaluation through the NEPA process and may require a change to the Forest Plan.

   T. 21 S., R.12 E.,
   Sec. 11, part of the $SW\frac{1}{4}$ shown on Attachment 1 as NSO.

3. In order to protect the Special Management Area, the lessee shall not occupy or use the surface of lands within the Special Management Area. This stipulation cannot be modified or eliminated.

   T. 21 S., R.12 E.,
   Sec. 11, part of the $S\frac{1}{2}$ shown on Attachment 1 as NSOM.

OR 47297

NOTICE
Newberry Caldera KGRA
Deschutes National Forest

The Bureau of Land Management (BLM) and the Forest Service have joint responsibility for approval of post lease activities on leases under the Newberry Monument legislation.

1. Prior to submission of a Plan of Operations for surface disturbing operations, the lessee shall meet with the authorized representative of the Forest Service to be apprised of specific requirements, restrictions, administrative rules and regulations, e.g. timber sales, special use permits, experimental studies, contracts, grazing, other mineral activities, water use and resource closures. This meeting will be waived if the lessee is sufficiently aware of local problems and ground rules of the area involved in the proposed operation.

2. All surface disturbing operations other than "casual use", defined by 43 CFR 3209.0-5(d), must be culturally cleared by the authorized representative of the Forest Service. When the lessee prepares a cultural report to comply with standard lease term No. 6, it must be signed and certified by a qualified archeologist acceptable to the authorized representative of the Forest Service.

3. The leased land may be in an area suitable for the habitat of threatened or endangered plant or animal species. All known viable habitat of these species will be identified for the lessee by the authorized officer of the BLM or the authorized representative of the Forest Service at the preoperational conference or field inspection with recommended mitigation measures. These may include (a) on-site biological and/or botanical surveys by authorities acceptable to the surface manager, (b) avoidance or (c) lessee recommendation of programs that comply with the provisions of the Endangered Species Act of 1973, as amended.

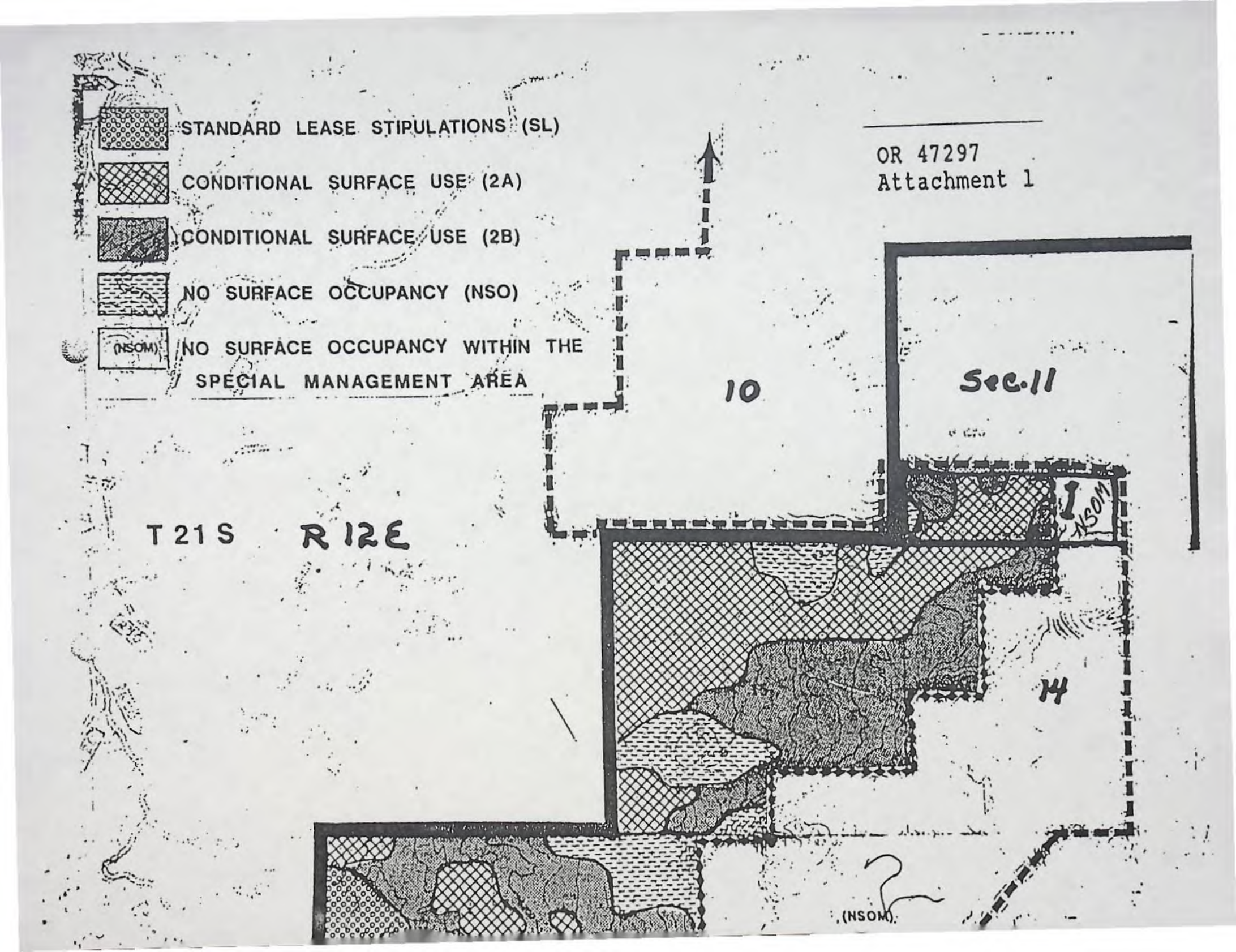
4. No occupancy or other surface disturbance will be allowed on slopes in excess of 50 percent or on designated unstable/very unstable land types without written permission from the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

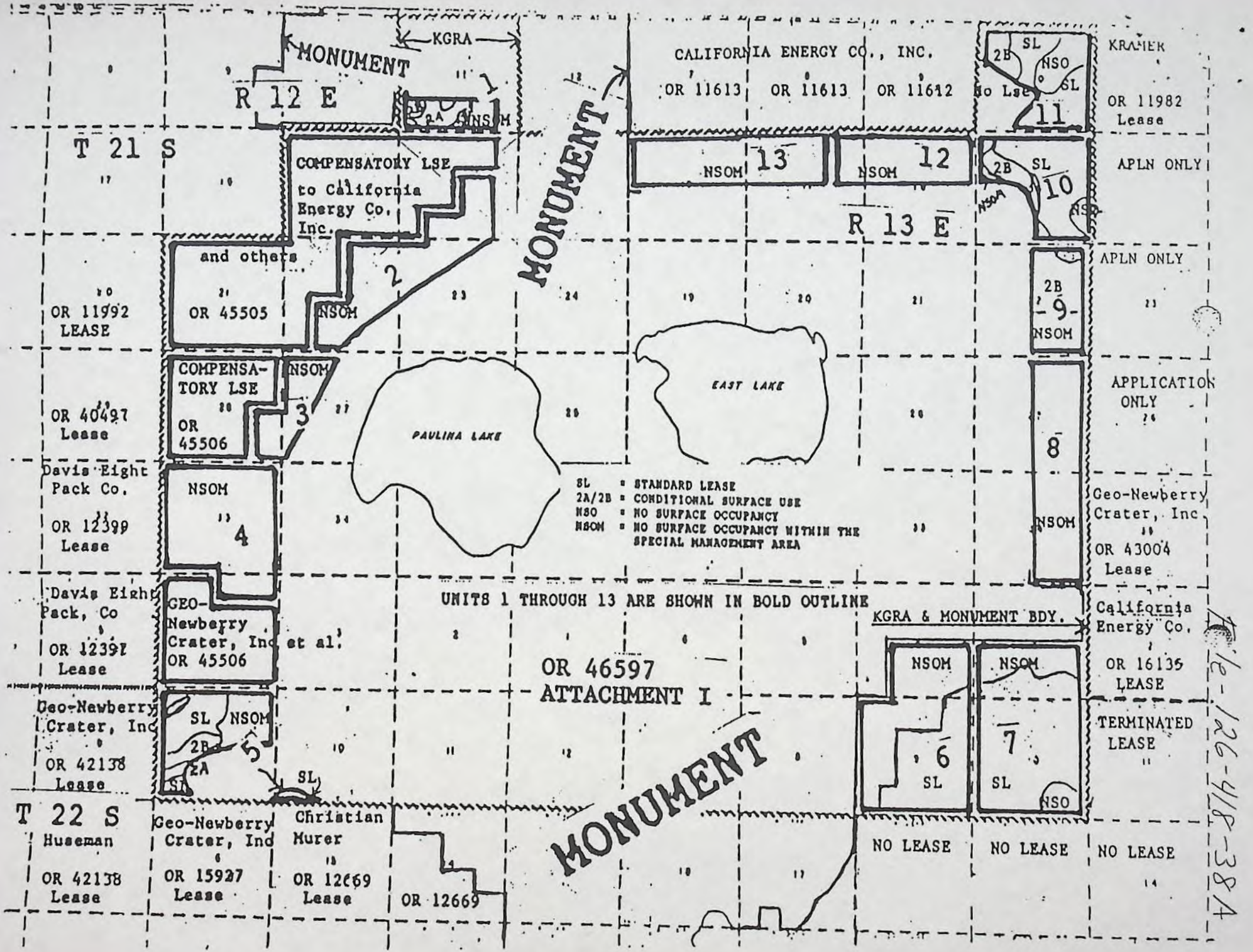
5. Operations adjacent to any surface water or wet soil areas, such as streams, springs, seeps, reservoirs or meadows, will require a buffer zone. The size will be specifically identified by the Forest Supervisor, Deschutes National Forest, and the authorized representative of the BLM.

6. All post leasing activities on areas containing caves will have restrictions to protect the cave formations.

7. Conditional Surface Use areas shown as 2A on Attachment 1 have high visual sensitivity and those shown as 2B have moderate visual sensitivity. Facility siting in the 2A areas may be more difficult than in the 2B areas.

8. Lessees may be required to participate in a long-term monitoring program on their leases.


STANDARD LEASE STIPULATIONS (SL)
CONDITIONAL SURFACE USE (2A)
CONDITIONAL SURFACE USE (2B)
NO SURFACE OCCUPANCY (NSO)
(NSOM) NO SURFACE OCCUPANCY WITHIN THE SPECIAL MANAGEMENT AREA
OR 47297
Attachment 1
10
Sec. 11
T 21 S
R 12 E
NSOM
14
(NSOM)



86-126-418-384

NUMBER 05774

Check 100.00 NO _____ Cash _____

- - - - - - - - - - - - - - - - - - - -

_____ Surface Application

_____ Reservoir Application

✓ Ground Water Application

_____ Transfer Application

_____ Power Claim

_____ Hydroelectric Examination

_____ Hydroelectric License

_____ Copying

_____ Assignment

_____ Extension of Time

_____ Other

_____ P-6

_____ Quadrangle

_____ Basin

_____ Protest

_____ Constructors Examination

_____ Constructors License

_____ Adjudication

0/100

Mike M.

STATE OF OREGON
WATER RESOURCES DEPARTMENT
158 12TH ST. N.E.
SALEM, OR 97310-0210
378-8455 / 378-8130 (FAX)

RECEIPT # INVOICE # 000526

RECEIVED FROM: C E Exploration
BY:

APPLICATION	G 13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK: # 24-22 ☒ OTHER: (IDENTIFY) ☐

TOTAL REC'D $ 50.00

0417 WRD MISC CASH ACCT

	ADJUDICATIONS	$
	PUBLICATIONS / MAPS	$
_____	OTHER: (IDENTIFY) _____	$
_____	OTHER: (IDENTIFY) _____	$

REDUCTION OF EXPENSE

_____ CASH ACCT. $

_____ PCA AND OBJECT CLASS _____ VOUCHER #

0427 WRD OPERATING ACCT

	MISCELLANEOUS				
0407	COPY FEES				$
0410	RESEARCH FEES				$
0408	MISC REVENUE: (IDENTIFY)				$
TC165	DEPOSIT LIAB. (IDENTIFY)				$
	WATER RIGHTS:	**EXAM FEE**		**RECORD FEE**	
0201	SURFACE WATER	$	0202		$
0203	GROUND WATER	$ 0	0204		$ 50.00
0205	TRANSFER	$	0206		$
	WELL CONSTRUCTION	**EXAM FEE**		**LICENSE FEE**	
0218	WELL DRILL CONSTRUCTOR	$	0219		$
	LANDOWNER'S PERMIT		0220		$

_____ OTHER (IDENTIFY) _____

0437 WELL CONST. START FEE

0211	WELL CONST START FEE	$	CARD #	
0210	MONITORING WELLS	$	CARD #	

_____ OTHER (IDENTIFY) _____

0539 LOTTERY PROCEEDS

1302	LOTTERY PROCEEDS	$

0467 HYDRO ACTIVITY

		LIC NUMBER	
0233	POWER LICENSE FEE (FW/WRD)		$
0231	HYDRO LICENSE FEE (FW/WRD)		$
_____	HRDRO APPLICATION	_____	$

RECEIPT # 000526 DATED: 3-15-96 BY: Flo L

Distribution-White Copy-Customer, Yellow Copy-Fiscal, Blue Copy-File, Buff Copy-Fiscal

STATE OF OREGON

WATER RESOURCES DEPARTMENT

RECEIPT # 131320

158 12TH ST. N.E.
SALEM, OR 97310-0210
378-8455 / 378-8130 (FAX)

INVOICE #_____

RECEIVED FROM: CE Exploration

BY: _____

APPLICATION	G 13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK: # 1124 ☒ OTHER: (IDENTIFY) ☐ _____

TOTAL REC'D	$ 100.00

01-00-0 WRD MISC CASH ACCT

842.010	ADJUDICATIONS		$
831.087	PUBLICATIONS / MAPS		$
830.650	PARKING FEES Name / month	_____	$
_____	OTHER: (IDENTIFY)	_____	$

REDUCTION OF EXPENSE

_____ CASH ACCT. $

_____ COST CENTER AND OBJECT CLASS _____ VOUCHER #

03-00-0 WRD OPERATING ACCT

MISCELLANEOUS

840.001	COPY FEES		$
850.200	RESEARCH FEES		$
880.109	MISC REVENUE: (IDENTIFY)	_____	$
520.000	OTHER (P-6) (IDENTIFY)	_____	$

		EXAM FEE		RECORD FEE
	WATER RIGHTS:			
842.001	SURFACE WATER	$	842.002	$
842.003	GROUND WATER	$ 0	842.004	$ 100.00
842.005	TRANSFER	$	842-006	$
	WELL CONSTRUCTION	**EXAM FEE**		**LICENSE FEE**
842.022	WELL DRILL CONSTRUCTOR	$	842.023	$
	LANDOWNER'S PERMIT		842.024	$

_____ OTHER (IDENTIFY) _____

06-00-0 WELL CONST. START FEE

842.013	WELL CONST START FEE	$	CARD #	
_____	MONITORING WELLS	$	CARD #	

_____ OTHER (IDENTIFY) _____

45-00-0 LOTTERY PROCEEDS

864.000	LOTTERY PROCEEDS	$

07-00-0 HYDRO ACTIVITY

		LIC NUMBER	
842.011	POWER LICENSE FEE (FW/WRD)		$
842.115	HYDRO LICENSE FEE (FW/WRD)		$
_____	HYDRO APPLICATION	_____	$

RECEIPT # 131320 DATED: 1-5-96 BY: [signature]

Distribution–White Copy-Customer, Yellow Copy-Fiscal, Blue Copy-File, Buff Copy-Fiscal

06367

NUMBER_____

Check 50 00/00 Mo_____ Cash_____

____ Surface Application

____ Reservoir Application

✓ Ground Water Application 0 / 50

____ Transfer Application

____ PFO Request

____ Research

____ Hydroelectric Fees

____ Copying

____ Assignment Doug B.

____ Extension of Time

____ Protest

____ Other G-13711

CE EXPLORATION COMPANY

DETACH AND RETAIN THIS STATEMENT
THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW.
IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DESIRED.

DELUXE FORM TWC-3 V-7

530
Y194000
2559

Application 13711 Record Fee

CE EXPLORATION COMPANY

DETACH AND RETAIN THIS STATEMENT
THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW.
IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DESIRED.

DELUXE FORM TWC-3 V-7

530 Y194000
2559

DETACH AND RETAIN THIS STATEMENT

THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW. IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DESIRED.

CE EXPLORATION COMPANY

519
9000000
6574

FILE#: G-13711

ORNI 4, LLC
ATTN: CHRISTY L MORRIS
980 GREG STREET
SPARKS NV 89436

FILE#: G-13711

ORNI 4, LLC
ATTN: CHRISTY L MORRIS
980 GREG STREET
SPARKS NV 89436

FILE#: G-13711

ORNI 4, LLC
ATTN: CHRISTY L MORRIS
980 GREG STREET
SPARKS NV 89436

NUMBER 96746

Check $200.00 NO _____ Cash _____

- - - - - - - - - - - - - - - - - - -

_____ Surface Application

_____ Reservoir Application

X Ground Water Application

_____ Transfer Application

_____ Power Claim

_____ Hydroelectric Examination

_____ Hydroelectric License

_____ Copying

_____ Assignment

_____ Extension of Time

_____ Other

_____ P-6

_____ Quadrangle

_____ Basin

_____ Protest

_____ Constructors Examination

_____ Constructors License

_____ Adjudication

100 Exam

DATA Center

STATE OF OREGON
WATER RESOURCES DEPARTMENT

RECEIPT # 113060

158 12TH ST. N.E.
SALEM, OR 97310-0210
378-8455 / 378-8130 (FAX)

G

RECEIVED FROM: C E Exploration Co.
BY:

APPLICATION	13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK: # ☒ 24227 OTHER: (IDENTIFY) ☐ _____ TOTAL REC'D $ 200.

01-00-0 WRD MISC CASH ACCT

842.010	ADJUDICATIONS		$
831.087	PUBLICATIONS / MAPS		$
830.650	PARKING FEES Name / month		$
_____	OTHER: (IDENTIFY)		$

REDUCTION OF EXPENSE CASH ACCT. $

COST CENTER AND OBJECT CLASS VOUCHER #

03-00-0 WRD OPERATING ACCT

MISCELLANEOUS:

840.001	COPY FEES		$
850.200	RESEARCH FEEDS		$
880.109	MISC REVENUE: (IDENTIFY)		$
520.000	OTHER (P-6) (IDENTIFY)		$

WATER RIGHTS:

		EXAM FEE		RECORD FEE
842.001	SURFACE WATER	$	842.002	$
842.003	GROUND WATER	$ 200.	842.004	$
842.005	TRANSFER	$	842.006	$

WELL CONSTRUCTION

		EXAM FEE		LICENSE FEE
842.022	WELL DRILL CONSTUCTOR	$	842.023	$
	LANDOWNER'S PERMIT		842.024	$
_____	OTHER (IDENTIFY)			

06-00-0 WELL CONST START FEE

842.013	WELL CONST START FEE	$	CARD #	
	MONITORING WELLS	$	CARD #	

45-00-0 LOTTERY PROCEEDS

864.000	LOTTERY PROCEEDS	$

07-00-0 HYDRO ACTIVITY LIC NUMBER

842.011	POWER LICENSE FEE (FW/WRD)		$
842.115	HYDRO LICENSE FEE (FW/WRD)		$
_____	HYDRO APPLICATION		$

RECEIPT # 113060 DATED: 6/10/94 BY: D. Buell

Distribution–White Copy-Customer, Yellow Copy-Fiscal, Blue Copy-File, Buff Copy-Fiscal

01356

NUMBER_____

Check 400.00 NO_____ Cash_____

- - - - - - - - - - - - - - - - - - - -

_____Surface Application

_____Reservoir Application

+ Ground Water Application

_____Transfer Application G-13711

_____Power Claim 0/100 - 0/300 -G-13710

_____Hydroelectric Examination

_____Hydroelectric License

_____Copying

_____Assignment

_____Extension of Time

_____Other

_____P-6

_____Quadrangle

_____Basin

_____Protest

_____Constructors Examination

_____Constructors License

_____Adjudication

Mike M.

STATE OF OREGON
WATER RESOURCES DEPARTMENT

RECEIPT # 124786

158 12TH ST. N.E.
SALEM, OR 97310-0210
378-8455 / 378-8130 (FAX)

INVOICE # _____

G

RECEIVED FROM: CE Exploration Co.
BY: _____

APPLICATION	13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK: # ☒ 24 22 OTHER: (IDENTIFY) ☐ _____

TOTAL REC'D $ 400.00

01-00-0 WRD MISC CASH ACCT

842.010	ADJUDICATIONS		$
831.087	PUBLICATIONS / MAPS		$
830.650	PARKING FEES Name / month	_____	$
_____	OTHER: (IDENTIFY)	_____	$

REDUCTION OF EXPENSE

_____ CASH ACCT. $

_____ COST CENTER AND OBJECT CLASS _____ VOUCHER #

03-00-0 WRD OPERATING ACCT

MISCELLANEOUS

840.001	COPY FEES		$
850.200	RESEARCH FEES		$
880.109	MISC REVENUE: (IDENTIFY)	_____	$
520.000	OTHER (P-6) (IDENTIFY)	_____	$

	WATER RIGHTS:	EXAM FEE		RECORD FEE
842.001	SURFACE WATER	$	842.002	$
842.003	GROUND WATER	$	842.004	$ 100.00
842.005	TRANSFER	$	842-006	$
	WELL CONSTRUCTION	**EXAM FEE**		**LICENSE FEE**
842.022	WELL DRILL CONSTRUCTOR	$	842.023	$
	LANDOWNER'S PERMIT		842.024	$

_____ OTHER (IDENTIFY) _____

06-00-0 WELL CONST. START FEE

842.013	WELL CONST START FEE	$	CARD #	
_____	MONITORING WELLS	$	CARD #	

_____ OTHER (IDENTIFY) _____

45-00-0 LOTTERY PROCEEDS

864.000	LOTTERY PROCEEDS	$

07-00-0 HYDRO ACTIVITY

		LIC NUMBER	
842.011	POWER LICENSE FEE (FW/WRD)		$
842.115	HYDRO LICENSE FEE (FW/WRD)		$
_____	HYDRO APPLICATION	_____	$

RECEIPT # 124786 DATED: 5-30-75 BY: D. Buckley

Distribution–White Copy-Customer, Yellow Copy-Fiscal, Blue Copy-File, Buff Copy-Fiscal

B98

Application No. G137711
Permit No. G12595

Name ... C E EXPLORATION CO.
Address ... 34 NW 1ST AVE SUITE 302 PORTLAND, 97209

Assigned ...
Address ...
Beginning construction JUL 8 1997
Completion of construction OCT 1 1998
Extended to ...
Complete application of water OCT 1 1999
Extended to ...

Form 111

13711
Record. fee

STATE OF OREGON
WATER RESOURCES DEPARTMENT

RECEIPT # 124786

158 12TH ST. N.E.
SALEM, OR 97310-0210
378-8455 / 378-8130 (FAX)

INVOICE # _____

G

RECEIVED FROM: CE Exploration Co.
BY: _____

APPLICATION	13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK: # ☒ 24-27 OTHER: (IDENTIFY) ☐ _____

TOTAL REC'D $ 400.00

01-00-0 WRD MISC CASH ACCT

842.010	ADJUDICATIONS		$
831.087	PUBLICATIONS / MAPS		$
830.650	PARKING FEES Name / month	_____	$
_____	OTHER: (IDENTIFY)	_____	$

REDUCTION OF EXPENSE CASH ACCT. _____ $ _____

COST CENTER AND OBJECT CLASS _____ VOUCHER # _____

03-00-0 WRD OPERATING ACCT

	MISCELLANEOUS				
840.001	COPY FEES				$
850.200	RESEARCH FEES				$
880.109	MISC REVENUE: (IDENTIFY)	_____			$
520.000	OTHER (P-6) (IDENTIFY)	_____			$
	WATER RIGHTS:	**EXAM FEE**			**RECORD FEE**
842.001	SURFACE WATER	$	842.002		$
842.003	GROUND WATER	$	842.004		$ 100.00
842.005	TRANSFER	$	842-006		$
	WELL CONSTRUCTION	**EXAM FEE**			**LICENSE FEE**
842.022	WELL DRILL CONSTRUCTOR	$	842.023		$
	LANDOWNER'S PERMIT		842.024		$
_____	OTHER (IDENTIFY) _____				

06-00-0 WELL CONST. START FEE

842.013	WELL CONST START FEE	$	CARD #	
_____	MONITORING WELLS	$	CARD #	
_____	OTHER (IDENTIFY) _____			

45-00-0 LOTTERY PROCEEDS

864.000	LOTTERY PROCEEDS	$

07-00-0 HYDRO ACTIVITY

		LIC NUMBER	
842.011	POWER LICENSE FEE (FW/WRD)		$
842.115	HYDRO LICENSE FEE (FW/WRD)		$
_____	HYDRO APPLICATION	_____	$

RECEIPT # 124786 DATED: 5-30-95 BY: D. Brockett

Distribution–White Copy-Customer, Yellow Copy-Fiscal, Blue Copy-File, Buff Copy-Fiscal

RECEIVED
JAN - 5 1996
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON

WATER RESOURCES DEPARTMENT

RECEIPT # 101277

725 Summer St. N.E. Ste. A
SALEM, OR 97301-4172
(503) 986-0900 / (503) 986-0904 (fax)

INVOICE # _____

RECEIVED FROM: ORMAT NEVADA INC

BY: _____

APPLICATION	G-13711
PERMIT	
TRANSFER	

CASH: ☐ CHECK:# ☒ 071807 OTHER: (IDENTIFY) ☐ _____

TOTAL REC'D $ 75.00

RECEIVED
OVER THE COUNTER

1083 TREASURY 4170 WRD MISC CASH ACCT

0407	COPIES	$
_____	OTHER: (IDENTIFY) _____	$

0243 I/S Lease _____ 0244 Muni Water Mgmt. Plan _____ 0245 Cons. Water _____

4270 WRD OPERATING ACCT

PLA 46111

	MISCELLANEOUS			
0407	COPY & TAPE FEES			$
0410	RESEARCH FEES			$
0408	MISC REVENUE: (IDENTIFY) Assignment			$ 7500
TC162	DEPOSIT LIAB. (IDENTIFY) _____			$
0240	EXTENSION OF TIME			$
	WATER RIGHTS:	EXAM FEE		RECORD FEE
0201	SURFACE WATER	$	0202	$
0203	GROUND WATER	$	0204	$
0205	TRANSFER	$		
	WELL CONSTRUCTION	EXAM FEE		LICENSE FEE
0218	WELL DRILL CONSTRUCTOR	$	0219	$
	LANDOWNER'S PERMIT		0220	$

_____ OTHER (IDENTIFY) _____

0536 TREASURY 0437 WELL CONST. START FEE

0211	WELL CONST START FEE	$	CARD #
0210	MONITORING WELLS	$	CARD #

_____ OTHER (IDENTIFY) _____

0607 TREASURY 0467 HYDRO ACTIVITY LIC NUMBER

0233	POWER LICENSE FEE (FW/WRD)		$
0231	HYDRO LICENSE FEE (FW/WRD)		$
_____	HYDRO APPLICATION		$

____ TREASURY OTHER / RDX

FUND _____ TITLE _____

OBJ. CODE _____ VENDOR # _____

DESCRIPTION _____ $

RECEIPT: 101277 DATED: 9-30-10 BY: _____

Distribution – White Copy - Customer, Yellow Copy - Fiscal, Blue Copy - File, Buff Copy - Fiscal

G-13711
DAVENPORT NEWBERRY HOLDINGS, LLC
300 ATLANTIC STREET, STE 301
STAMFORD CT 06901

G-13711
DAVENPORT NEWBERRY HOLDINGS, LLC
300 ATLANTIC STREET, STE 301
STAMFORD CT 06901

G-13711
DAVENPORT NEWBERRY HOLDINGS, LLC
300 ATLANTIC STREET, STE 301
STAMFORD CT 06901

G-13711
DAVENPORT NEWBERRY HOLDINGS, LLC
300 ATLANTIC STREET, STE 301
STAMFORD CT 06901

G-13711
DAVENPORT NEWBERRY HOLDINGS, LLC
300 ATLANTIC STREET, STE 301
STAMFORD CT 06901