

U.S. Forest Service
and
Bureau of Land Management
Record of Decision
NEWBERRY GEOTHERMAL PILOT PROJECT

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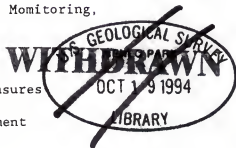
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THE DECISIONS

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 Collins 10/30/94
SALLY COLLINS Date
Forest Supervisor
Deschutes National Forest

James L. Hancock 10/30/94
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 EPA 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 be 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 be 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 NNVN, 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 NNVN

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 than 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 plant site prior to injection to the geothermal reservoir.
- * Pads and facilities will be designed to direct drainage to sumps and to 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 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.
- * An Emergency Contingency Plan will be established for accidental spills or 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.

- * 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 be 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. Secondly, 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 being 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 from 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 than 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 within 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 omission, 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 non-significant 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.

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