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CALIFORNIA ENERGY COMMISSION

MASTER

PRELIMINARY REPORT

ON THE
DEPARTMENT OF WATER RESOURCES
NOTICE OF INTENTION
TO FILE AN APPLICATION FOR CERTIFICATION

OF
DWR BOTTLE ROCK

78-NOI-7



MARCH 1979

DISCLAIMER

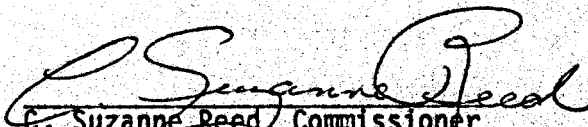
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March 26, 1979

The California Energy Resources Conservation and Development Commission, through the Commission Committee assigned to conduct proceedings on the Notice of Intention to file an Application for Certification of the State of California Department of Water Resources' Bottle Rock geothermal project (78-NOI-7), hereby submits its Preliminary Report pursuant to Public Resources Code Sections 25510 and 25512.


C. Suzanne Reed, Commissioner
and Presiding Member of the
Committee


Alan Pasternak, Commissioner
and Member of the Committee

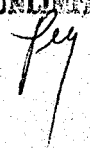


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I. INTRODUCTION

A. The Preliminary Report

On October 5, 1978, the State of California Department of Water Resources (DWR; Applicant) filed with the Energy Resources Conservation and Development Commission (Commission) a Notice of Intention (Notice; NOI) to file an Application for Certification (Application; AFC) of its BOTTLE ROCK geothermal power plant (55 MW) and associated facilities, including a transmission tap-line, proposed to be constructed in Lake County. The proposed project would be located on the Francisco leasehold in the Lake County portion of The Geysers Known Geothermal Resource Area (KGRA). The steam to operate the proposed project would be provided primarily under the auspices of McCulloch Oil Corporation.

1. Contents

This Preliminary Report on the DWR Bottle Rock geothermal power plant proposal has been prepared pursuant to California Public Resources Code Sections 25510, 25512, and 25540.*

This Report presents the preliminary Findings of fact and Conclusions adopted by the Commission Committee, consisting of Commissioner C. Suzanne Reed, presiding, and Commissioner Alan Pasternak, assigned to conduct proceedings on

*The Committee is aware that as of January 1, 1979, these sections have been amended (Stats. 1978, Ch. 1013, sections 9, 10, 10.5). Since the present case was filed under the pre-existing statute and, since the changes do not significantly affect the rights of the parties or the duties of the Commission, in order to preserve expeditious processing of the NOI, the Committee is issuing this Preliminary Report in accordance with the pre-existing statutory and regulatory provisions.

the Notice. In addition, this Report contains a description of the proposed project (Section I.B.), a summary of the proceedings to date (Section I.C.), comments from the general public (Appendix B), and local, state, and federal government agency comments on the proposal (Appendix C). The Report also contains the responses of the Applicant and the Commission staff to all agency comments submitted regarding the proposed project (Appendix D). Finally, this Report presents the Committee's view of those issues that require further consideration in future proceedings on the proposed project (Section V).

Pursuant to Public Resources Code Sections 25512 and 25540, this Report presents preliminary Findings and Conclusions on:

- a. conformity to the forecast of statewide and service area electric power demands;
- b. the degree to which the proposed site and facility conforms with applicable local, regional, state, and federal standards, ordinances, and laws;
- c. the safety and reliability of the facility; and
- d. the relative merit of any alternative site and related facility proposed in the Notice or in sufficient detail at the hearings.

2. Evidentiary Basis

Pursuant to Public Resources Code section 25512, a Preliminary Report is to be based on evidence, documents, and comments presented during hearings and conferences on the Notice, comments submitted to the Commission by local, regional, state, and federal agencies and the

public, and upon independent studies conducted by the Commission staff. Evidence presented in these proceedings includes position papers prepared by the Commission staff on various issues, portions of the NOI and supporting affidavits submitted by the Applicant, all of which serve as written testimony; direct oral testimony from both Applicant and Staff on Public Health and Geotechnical issues; matters officially noticed by the Committee pursuant to 20 California Administrative Code Section 1213 pertaining to the issue of Need; proposed Findings and Conclusions concerning Need, Public Health, and Geotechnical issues submitted separately by the Staff and Applicant; and a Joint Statement of Findings and Conclusions (Joint Statement) proposed to the Committee by the Staff and Applicant, covering the other areas enumerated herein, for adoption and incorporation into this Preliminary Report.

During the Prehearing Conference at which Staff and Applicant presented joint and separate Prehearing Conference Statements and Findings and Conclusions, the Committee gave all those interested in the proceeding an opportunity to question or object to any Finding or Conclusion proposed for adoption. Furthermore, the Committee asked each party whether it wished to cross-examine witnesses for the other party or present affirmative evidence of its own on any issue.

At the Prehearing Conference, the parties indicated that they had reached agreement, as evidenced in the final version of the Joint Statement, on all issues except for Need, Public Health, and Geotechnical. In addition, the California Department of Fish and Game

expressed concerns over the suitability of the site which Applicant proposed in the Notice. Accordingly, the Committee scheduled a public evidentiary hearing for January 25, 1979 and directed the parties to provide testimony, subject to cross-examination, supporting their respective positions. A more detailed discussion of these proceedings is contained in Section I.C., and also on an issue by issue basis in Sections II.A. (Need), III.C.3. (Biological Resources), IV.B. (Public Health), and IV. C.5 (Geotechnical issues), following.

The Joint Statement of Findings and Conclusions, as proposed during the Committee's Prehearing Conference, is set forth in this Preliminary Report and, with few exceptions, has been adopted by the Committee as preliminary Findings and Conclusions pursuant to Public Resources Code Sections 25512 and 25540. The Joint Statement and the separate Statements also form a partial basis for the Findings and Conclusions on the areas of Need, Public Health, and Geotechnology. The Committee has, however, revised certain language regarding these issues to more accurately reflect Commission policy and to encompass the evidence adduced from testimony and cross-examination thus far in the course of these proceedings.

3. Opportunity for Response

Written responses to the Preliminary Report must be filed within 30 days of publication, and the Committee will hold public hearings on the Report commencing no earlier than 14 days after publication. At the first hearing, a party may express its intention to present

evidence contrary to any Findings or Conclusions set forth in this Report or to cross-examine witnesses for another party. Also, each party should take advantage of this opportunity to comment on, or express its intent to contest, any Finding or Conclusion contained in this Report. In addition, the Committee will provide any interested person or public agency an opportunity to comment on the Report during the course of these hearings.

Hearings conducted following the issuance of this Report will lead to the issuance of a Final Report by the Committee and, within a short period thereafter, to approval or disapproval of the Notice by the full Commission. If the Notice is approved, DWR may then file an Application for Certification of the proposed BOTTLE ROCK geothermal project. Following further proceedings on the Application, the full Commission will act to grant or deny certification. Such action could occur as early as the winter of 1979.

Any person who, after reading this Report, feels he or she may have an interest that would be served by participating as a party to these proceedings may petition the Committee for leave to intervene. Assistance in becoming an intervenor may be obtained by contacting Stephen Kolb of the Public Adviser's Office at (916) 920-6906 or toll free (800) 852-7515.

B. Description of the Proposed DWR BOTTLE ROCK Geothermal Project.

1. The Facility

The proposed DWR BOTTLE ROCK geothermal project would be constructed on the Francisco leasehold parcel in The Geysers area of Lake County.

It would be a dry steam geothermal power plant with a gross operating capacity of 55 MW. The generating equipment would consist of a 55 MW turbine-generator at a steam flow of approximately 1,000,000 pounds per hour. In addition to the turbine generator, the proposed power plant would include a condensing system, cooling tower, electrical switchyard, and atmospheric emission control system. The plant is projected to begin operation in April 1983.

It is anticipated that the proposed site would occupy a total of approximately six acres, four of which would consist of multilevel graded surface and two of cut and fill slopes. The turbine-generator building, switchyard, and cooling tower would be constructed on the fill area of the pad, while the hydrogen sulfide abatement and the sulfur storage areas would be placed on the engineered fill area. The turbine building would house the turbine, condenser, generator, crane, control room, electrical room lobby, service bay, and storage areas. This building would be a concrete structure with a wood-framed roof, approximately 75 feet by 105 feet, and 65 feet high. A multiple cell, double flow mechanically induced draft type cooling tower would be used to dissipate heat from the power cycle. The cooling tower would be approximately 57 feet by 280 feet and 57 feet high; it would be located atop a reinforced concrete basin (see Figure 1). DWR plans to abate hydrogen sulfide (H_2S) emissions through the use of the Stretford Process, which scrubs the H_2S from the vent gas stream from the condenser and catalytically oxidizes the gas to elemental sulfur.

The switchyard would step up the voltage of the electrical power from the generator level of 13.8 kv to the 230 kv level required for economical power transmission. The switchyard would be located adjacent to the turbine-generator building and would be approximately 120 feet by 130 feet.

DWR proposes to construct a transmission tapline 1.2 miles in length that would interconnect with PG&E's proposed Unit 17 in Sonoma County (see Figure 2). The width of the right-of-way required for the tapline would be 125 feet, with a minimum ground clearance of 30 feet, as required by the California Public Utilities Commission General Order 95. Six or seven transmission towers would be necessary to complete the 1.2 mile tapline. These would be single circuit latticed steel towers, strung with 1,113 MCM, 61 strand aluminum conductors (see Figure 3).

After interconnection with proposed Unit 17, the Applicant anticipates that the power generated by the BOTTLE ROCK project would be transmitted out of The Geysers via PG&E's currently existing transmission routes.* DWR is currently negotiating with PG&E concerning "wheeling" this power, and is also seeking to develop additional feasible alternatives for transmitting its power out of The Geysers. The Committee ordered the Applicant to submit a report on the status of its negotiations with PG&E concerning transmission of power from The Geysers; the Applicant's response is included in this Report as Appendix F.

*In the NOI, the Applicant stated that additional transmission capacity which would be provided by construction of transmission lines proposed in the NOI for PG&E's Geysers Unit 16 (78-NOI-6; currently pending before a Committee of the Commission) is needed to get power out of The Geysers (NOI, p. VI-3).

2. The Site

Applicant selected the proposed site for the power plant after a study and evaluation of a total of 12 alternative sites. The proposed site was chosen after an interdisciplinary process which included evaluation of such criteria as: adequate level area; pad site elevation; accessibility; visibility; geology; economics; aesthetics; proximity of cultural and archaeological sites; and biological resources concerns (NOI, Section V; see Map 1). Two principal factors taken into consideration were that the plant be within one mile of the steam wells (for practical steam transmission) and that it be situated within the leasehold.

The proposed site selected by DWR (#4 on Map 1) would be located on the Francisco leasehold area of The Geysers situated in Lake County. This leasehold comprises approximately 350 acres and is located near Glenbrook, on Bottle Rock Road, in Sections 5 and 6, Township 11 North, Range 8 West, Mount Diablo Meridian (see Map 2). It would occupy a total of approximately six acres, four of which would consist of multilevel graded surface and two of cut and fill slopes. The Applicant anticipates that cut slopes would be 1.5:1 or less and fill slopes would be 2:1 or more. Vehicle access to the proposed site would be provided primarily by existing roads, with access from Bottle Rock Road via an improved private road. The steam supplier, McCulloch Oil Corporation, has limited term agreements with property owners in the vicinity for use of the access road from Bottle Rock Road (NOI, p. V-12).

The State Department of Fish and Game (DFG) challenged the suitability of the proposed site at the Prehearing Conference and offered an alternative site. DFG, however, withdrew its objections at the evidentiary hearing. A more complete discussion is contained in Section III.C.3., following.

3. The Steam Field

A large reservoir of geothermal steam exists in The Geysers Known Geothermal Resources Area (KGRA; see Figure 4). This natural resource is presently being used by PG&E to generate 502 MW of electric power. Four units representing another 400 MW of generating capacity are under construction. In addition to the DWR Bottle Rock project, several other units are being planned by power suppliers such as PG&E and the Northern California Power Agency (NCPA).

The steam supply field for the proposed project is located on the Francisco leasehold in Lake County. Two drill pad sites, the Francisco and Coleman sites (see Map 3), have been approved for construction. The Francisco pad is approximately 2,400 feet from the proposed power plant site, while the Coleman is approximately 1,800 feet from the site. A maximum of six wells may be drilled from each well pad site. Since approximately one million pounds of steam per hour would be required to power a 55 MW plant, a total of 12 producing and 2 injection wells are contemplated. Two wells have been drilled from the Francisco pad; the Coleman pad has not yet been constructed.

The Committee ordered the Applicant to submit a report on the status of the Lake County conditional use permits required for the steam wells. DWR's response is included in Appendix G of this Report.

4. Authorization Required

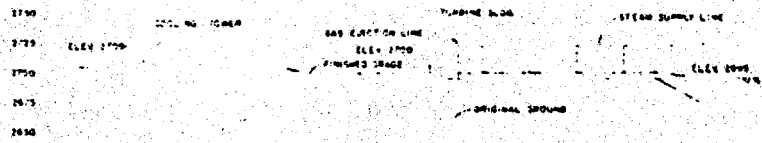
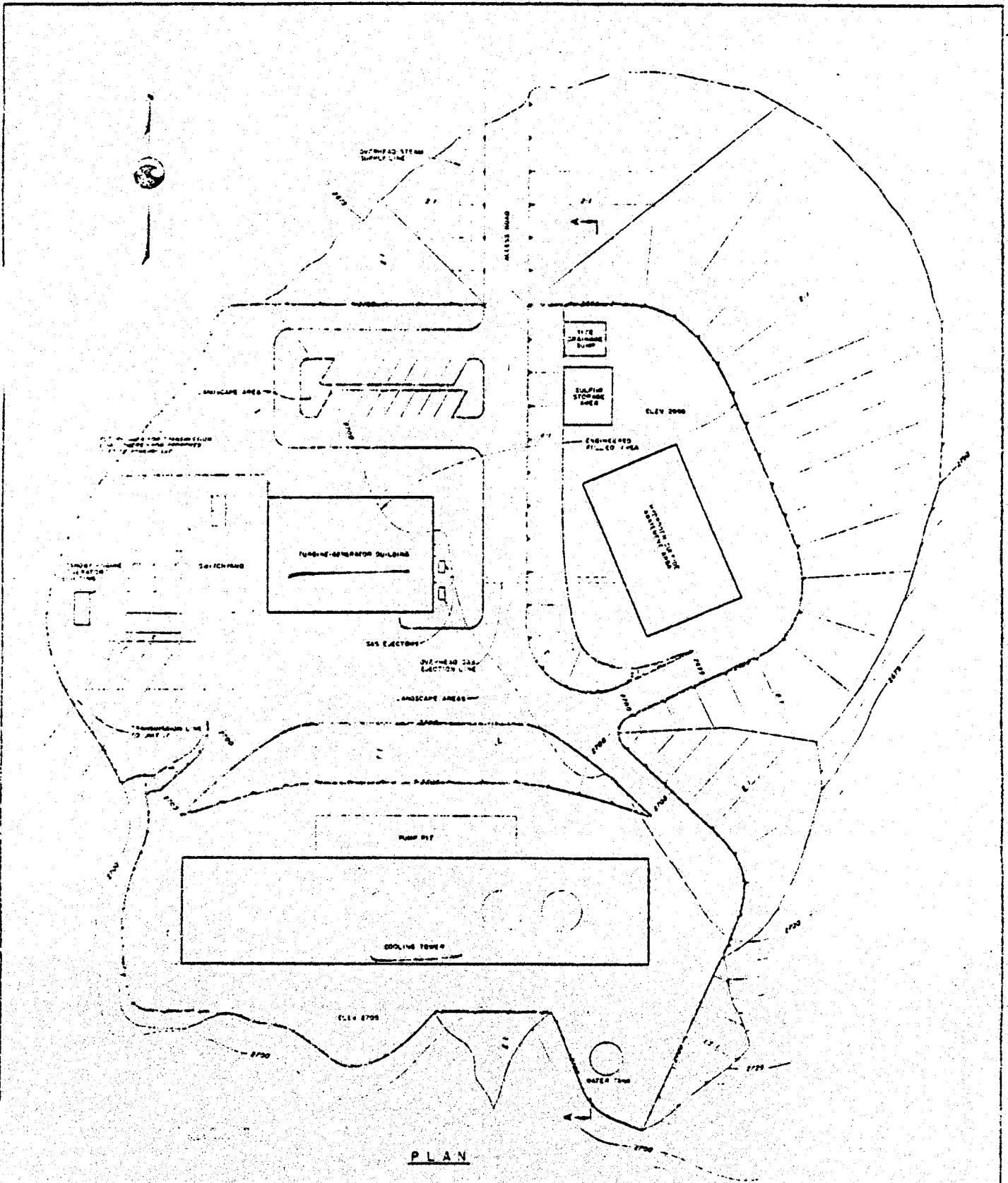
In order to proceed with construction of the proposed project, DWR and/or the steam supplier (McCulloch Oil) must receive the following major regulatory authorizations:

<u>Regulatory Authority</u>	<u>Authorization</u>	<u>Project Component</u>
1. Energy Resources Conservation and Development Commission	Certification to Construct and Operate	Power Plant and Transmission Line
2. Lake County Air Pollution Control District	Authority to Construct and Permit to Operate	Power Plant and Steam Field (Lake County)
3. Lake County Board of Supervisors	Conditional Use Permit	Steam Field (Lake County)
4. U.S. Environmental Protection Agency	Prevention of Significant Deterioration* (PSD)	Power Plant and Steam Field

C. Summary of Proceedings to Date

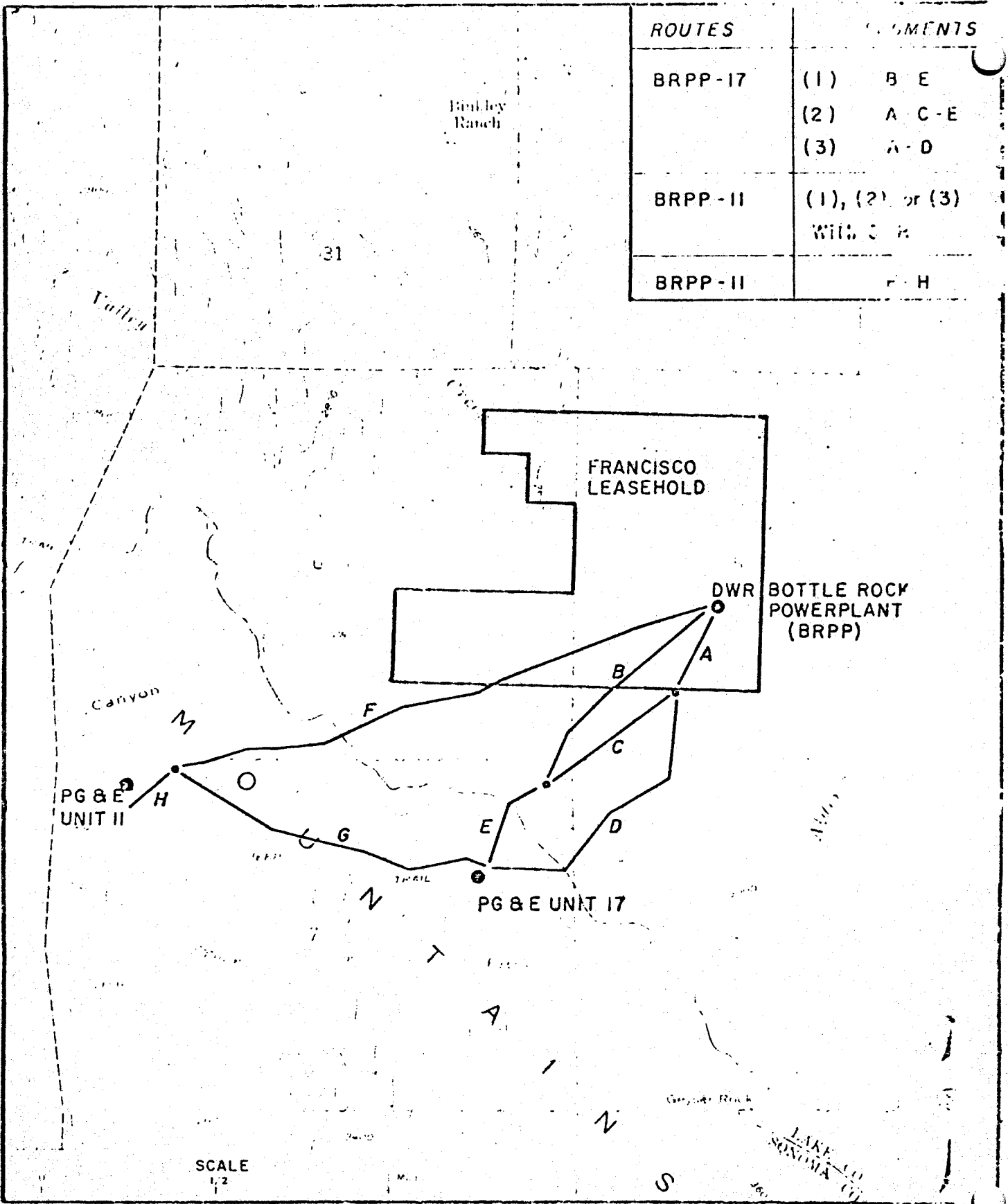
1. Submittal of Notice of Intention

*It is not yet certain whether PSD rules apply to the proposed project. Federal, state and local representatives have recently begun a series of conferences dealing with this question, among others. This Committee will recommend that the full Commission direct Staff to prepare a policy issue paper and that, after consideration of the paper, the Commission adopt a policy concerning the applicability of PSD regulations to H₂S emissions from geothermal power plants.



SECTION A-A

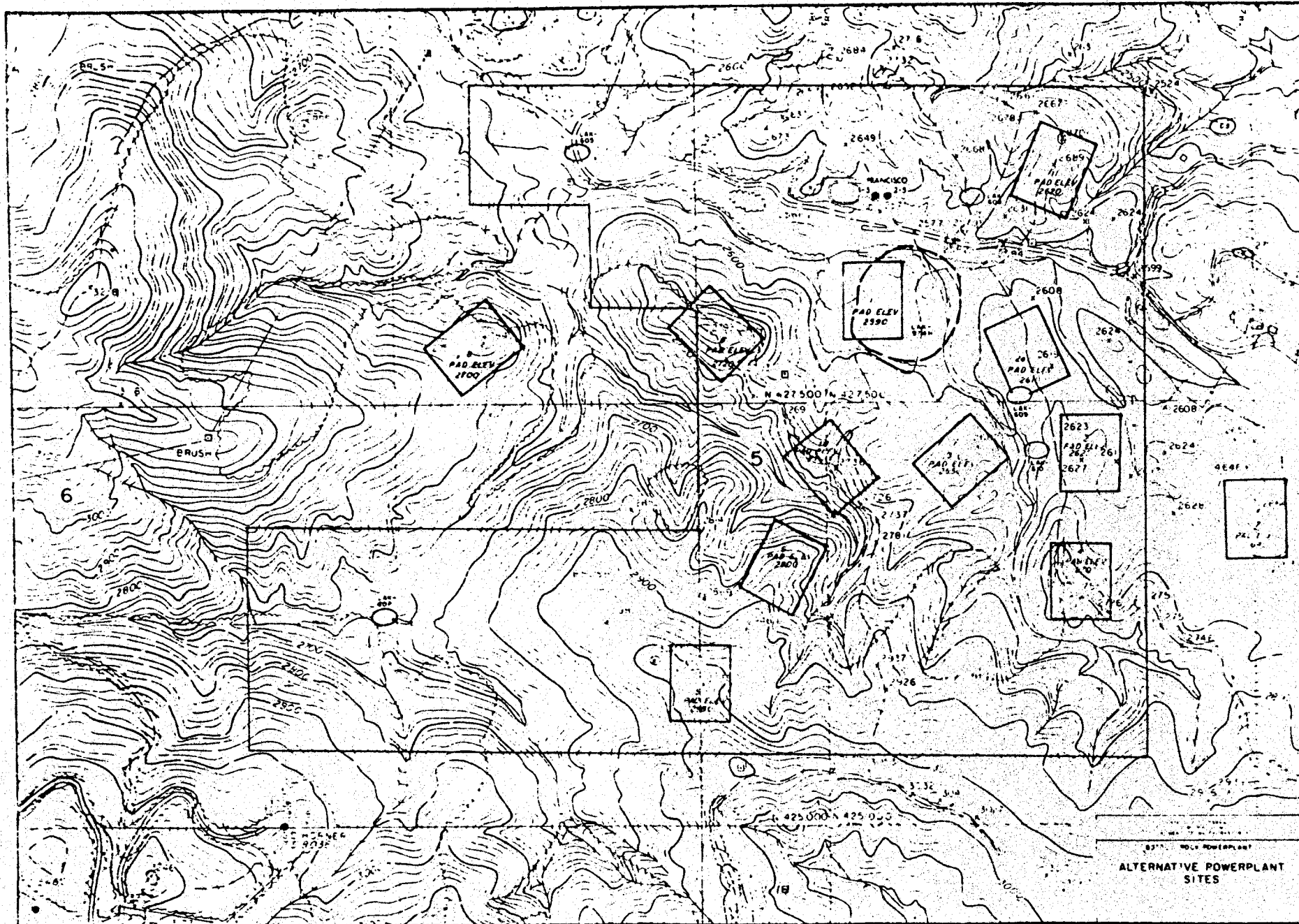
FIGURE 1

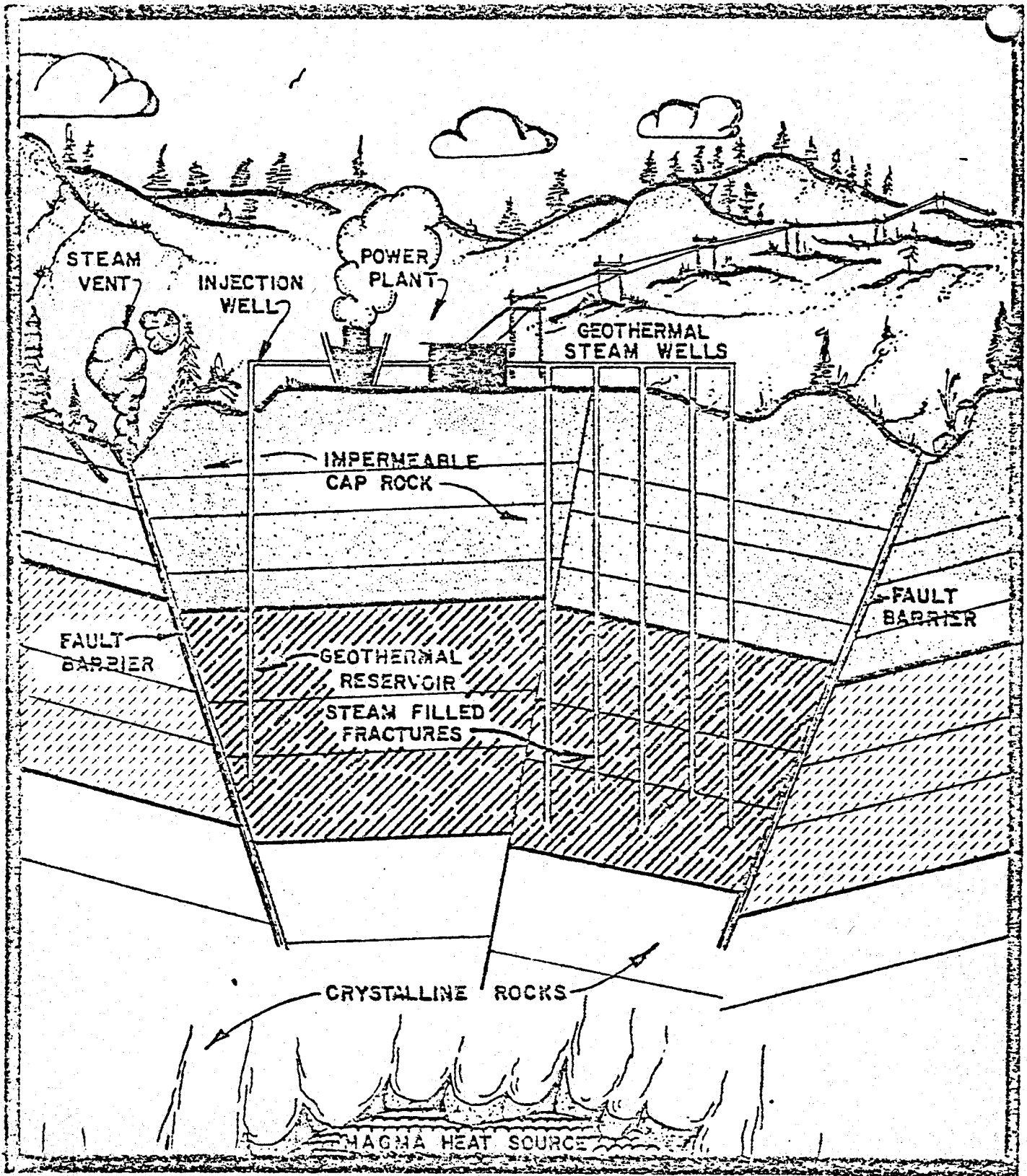


PROPOSED BOTTLE ROCK POWERPLANT TRANSMISSION CORRIDORS

ORIGINAL SOURCE:
BOTTLE ROCK NOI, p. VI-5

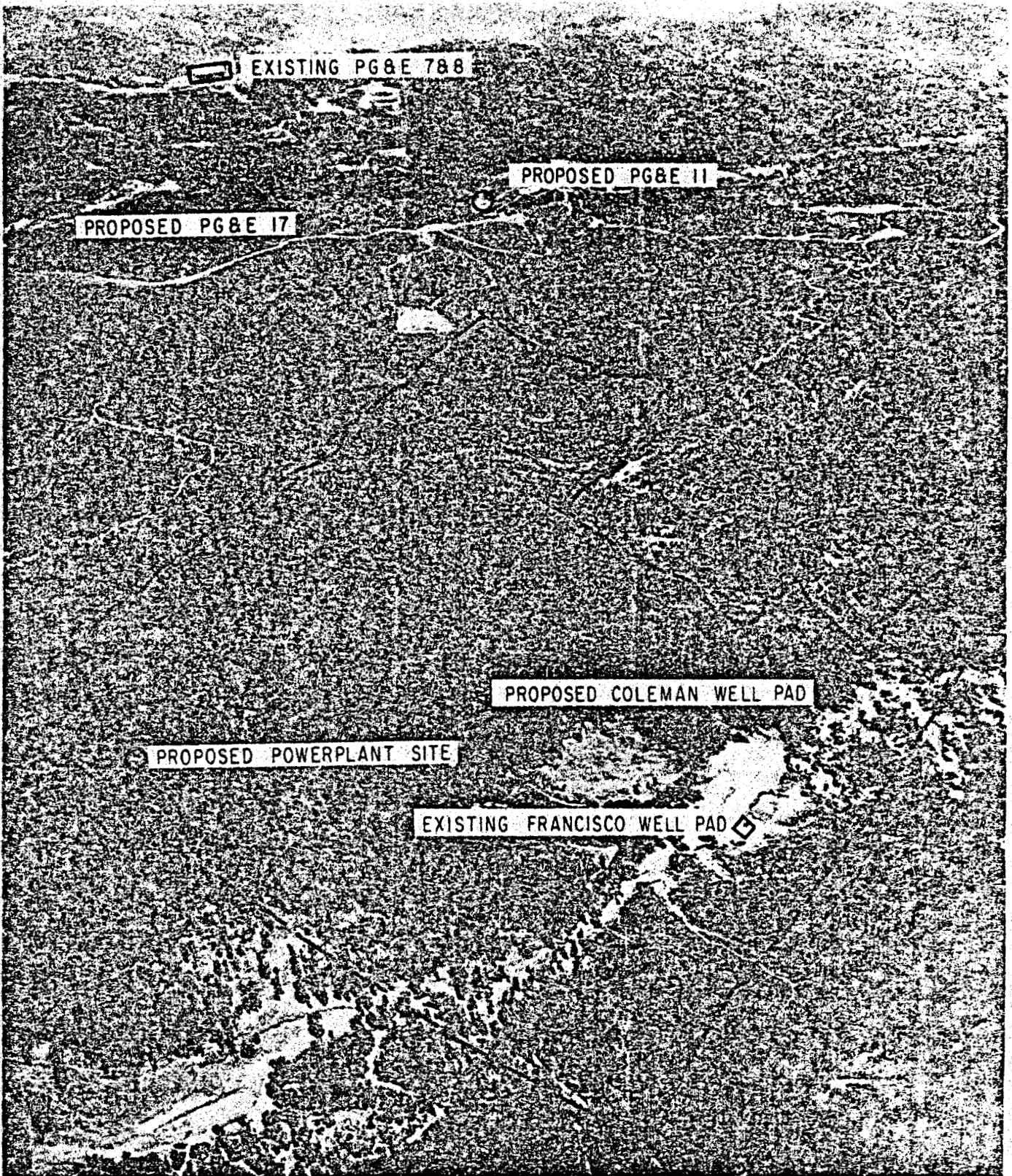
FIGURE 2





SIMPLIFIED GEOTHERMAL FIELD

FIGURE 4



AERIAL VIEW OF FRANCISCO LEASEHOLD LOOKING SOUTH
The dashed line indicates approximate boundary of the leasehold.

On October 5, 1978, the State Department of Water Resources (DWR) filed with the Commission a Notice of Intention (Notice) to file an Application for Certification (Application) for its BOTTLE ROCK geothermal power plant proposed to be constructed on the Francisco leasehold in Lake County. On October 26, 1978, the Executive Director of the Commission accepted the Notice as containing adequate technical data and information required by Commission regulations to enable the Staff to begin analysis of the proposal. Subsequently, on November 8, 1978, the Chairman of the Commission appointed a Committee composed of Commissioner C. Suzanne Reed, presiding, and Commissioner Alan Pasternak, to conduct proceedings on the Notice. A chronological account of events in these proceedings is contained in Appendix A.

2. Petitions to Intervene

To date, no members of the public, public agencies, or other persons or groups have sought leave to intervene in the proceedings on the DWR BOTTLE ROCK Notice. Recognizing its obligation to promote public participation in Energy Commission proceedings, the Committee supplemented the notices and requests for information issued in the course of this proceeding with a separate request on January 15, 1979 to the Boards of Supervisors and Planning Departments of Lake and Sonoma Counties specifically soliciting their views on the proposed project. While these entities have not responded, members of the general public and various public agencies have submitted comments on the NOI.

The Committee has taken these comments into consideration in preparing this Preliminary Report. For example, the concerns raised by the

State Department of Fish and Game have been resolved (see Section III.C.3, following); pursuant to Committee order, the Staff and Applicant have responded to each public agency comment submitted on the Notice (Appendix D); and the Lake County Air Pollution Control Officer participated substantially in the formulation of the Joint Proposed Air Quality Findings and Conclusions at the Prehearing Conference. Thus, although there have been no formal interventions in these proceedings, the Committee has nevertheless considered and benefitted from the comments of interested persons and agencies.

3. Issue Workshops

On November 9, 17, 21, and 27, 1978, December 7, 1978, and January 23, 1979, in Sacramento and Lakeport, the Commission staff held informal workshops to discuss issues and concerns related to the proposed project with DWR and other interested persons. As a result of those workshops, Staff prepared a series of position papers on the various issues and areas of concern including: need/demand conformance; air quality; geotechnical issues; socioeconomics; cultural resources; biological resources; public health; water quality; water resources; hydrology; soils; structural engineering; systems engineering; civil engineering/solid waste management; noise; and reliability and safety. These subjects were addressed at Prehearing Conference Statement workshops on December 21, 22, and 27, 1978 in Sacramento, and Air Quality was again discussed on January 9, 1979 in Lakeport.

The purpose of these workshops was to allow the Commission staff and the Applicant to attempt to prepare joint Findings of Fact and Conclusions on those issues which they believed would need no adjudication

in evidentiary hearings before the Committee, and to identify those areas of possible dispute where further information would be required before an issue could be resolved. The workshops also provided members of the public and interested agencies with an opportunity to propose additional or alternative Findings or Conclusions.

At the conclusion of the Prehearing Conference Statement workshops, the Staff and the Applicant had agreed on a Joint Prehearing Conference Statement (Joint Statement) encompassing all issues discussed in this Preliminary Report except for Need/Demand Conformance, Air Quality, and Geotechnology. The Joint Statement was made available to the public on December 29, 1978.

4. Informational Hearings

Pursuant to Public Resources Code Section 25509, the Committee conducted public informational hearings on December 4, 1978, in Santa Rosa and Lakeport, for the purpose of enabling Commission staff and DWR to make presentations to all interested agencies and members of the public concerning the proposed project and potential issues to be addressed during the proceedings. During these hearings, the Committee afforded the public the opportunity to pose questions to the Staff and to DWR, or make general comments or expressions of concern about the proposed project. At the informational hearing in Lakeport, an individual residing in the vicinity of the proposed project did voice concerns about the effects of geothermal development and H₂S emissions upon her health (see Appendix B).

5. Prehearing Conference

On January 9, 1979, the Committee held a Prehearing Conference in Lakeport to consider the Findings and Conclusions in the Joint Statement submitted by Staff and Applicant, the individual Prehearing Conference Statements submitted by the parties, and to identify areas of concern to those interested in the proceeding. The areas covered in the proposed Findings and Conclusions contained in the Joint Statement and in the individual Statements were discussed and the Committee requested that those present state any intention to cross-examine any witnesses for DWR or the Staff concerning any matter contained in any of the proposed Findings or Conclusions.

Disagreement became apparent concerning five areas on which proposed Findings and Conclusions were submitted:

- a. The State Department of Fish and Game (DFG) expressed concerns about the Biological Resources area, specifically questioning the suitability of the proposed site; the Staff and Applicant had evidenced no disagreement between themselves on this issue.
- b. The Staff and DWR discovered that a difference existed concerning a portion of the Public Health section of the Joint Statement to which they had previously agreed.
- c. Staff and Applicant reaffirmed their differences concerning Need/Demand Conformance and Geotechnical issues. Both Staff and Applicant indicated their desire to present witnesses and to

cross-examine one another's witnesses on the disputed areas in the course of forthcoming evidentiary hearings.

- d. Although Staff and Applicant had submitted separate Prehearing Conference Statements on the area of Air Quality, they did reach agreement on Proposed Findings and Conclusions at the Prehearing Conference. This portion of the Joint Statement, in which the Lake County Air Pollution Control Officer participated, was submitted to the Committee on January 19, 1979.

Following the Prehearing Conference, the Committee issued a Hearing Order on January 12, 1979 which notified the parties, concerned public agencies, and the public at large that an evidentiary hearing would be held on January 25, 1979, in Sacramento. This Order stated that two issues would require formal adjudication: "Public Health"--the effects of long-term exposure to low-level concentrations of H₂S; and "Geotechnical"--Steam Wells-damage by fault movement. The Committee scheduled the appearance of witnesses in accordance with the parties' statements at the Prehearing Conference and notified the parties of the procedure for cross-examination. The parties were also ordered to present their responses to the concerns raised by DFG at the Prehearing Conference. While the Staff had indicated that the area of need/demand conformance would require adjudication, the Committee Order stated further disagreement with the contention raised, informed the parties of matters it intended to officially notice in this regard, and specified the reasons why adjudication of the need issue would not be undertaken.* Finally, this Order

*For a more detailed discussion on this matter, see Section II.A, following.

indicated the basic procedures which would be followed at the evidentiary hearing regarding submitting evidence on both disputed and non-disputed areas, and specified certain actions to be taken and information to be submitted by the Staff and/or the Applicant prior to issuance of the Preliminary Report.

6. Evidentiary Hearing

The Committee conducted a public evidentiary hearing on January 25, 1979 in Sacramento. At this hearing, the Staff and the Applicant each formally stated their respective positions concerning the areas identified in the Joint Statement and reflected in the Joint Proposed Findings and Conclusions therein, and made formal offers of proof such as written testimony and supporting documents which formed the evidentiary basis for these positions. The Committee afforded those present the opportunity to challenge, rebut, or cross-examine upon each offer of proof on each subject area. No one present contested the positions asserted by Staff or Applicant, or the written testimony or other items offered into evidence, concerning the subject areas including proposed Findings and Conclusions contained in the Joint Statement.

Second, the Staff and the Applicant submitted written testimony supporting their joint position on the Biological Resources area, and each stated its view that the proposed site was acceptable. Although DFG had raised concerns with this site at the Prehearing Conference, a representative of that agency formally stated a change of position at the evidentiary hearing. DFG concerns had been satisfied in

the course of discussions with the Applicant since the Prehearing Conference, and that agency no longer wished to challenge the acceptability of the proposed site or to propose an alternative site (see Appendix E); it effectively withdrew its opposition to the site and relevant Findings and Conclusions contained in the Biological Resources portion of the Joint Statement (see Section III.C.3, following). The Committee thus did not proceed with adjudication of this issue.

Next, the Staff and the Applicant formally stated their positions and made offers of proof on the Public Health and Geotechnical areas as contained in the Joint Statement. While the Staff and the Applicant had agreed to certain Proposed Joint Findings and Conclusions on these areas, other portions still remained in dispute. The offers of proof at this point therefore dealt with these areas only to the extent that the parties agreed on the Proposed Findings and Conclusions as indicated at the Prehearing Conference. No one present objected to, or challenged, the positions of the parties or the offers of proof as thus qualified. The areas which remained in dispute are discussed below.

At the Prehearing Conference, Staff and DWR had submitted separate Statements containing Proposed Findings and Conclusions on the area of Need/Demand Conformance. The Committee ruled, in its January 12, 1979 Hearing Order, that this issue would not be adjudicated at the evidentiary hearing and specified certain items which it intended to officially notice. The Committee introduced the officially noticed matters into the evidentiary record and provided the opportunity to

challenge or rebut such matters. No objections were raised. The parties then formally stated their positions and submitted written testimony supporting their respective positions on the issue of Need/Demand Conformance. A detailed discussion of this issue, the Committee's rationale, and preliminary Findings and Conclusions are contained in Section II of this Report.

The Committee then proceeded to adjudication of the issue of "Public Health: health effects of long-term exposure to low-level concentrations of H₂S" as stated in the January 12 Hearing Order. Each party produced direct written and oral testimony which was subjected to cross-examination by the other party. A detailed discussion of this matter, and the Committee's resolution thereof, is contained in Section IV. B. of this Report.

Finally, the Committee proceeded to adjudication of the Geotechnical issue of "Steam Wells-Damage by Fault Movement" as stated in the January 12 Hearing Order. Each party produced direct written and oral testimony which was subjected to cross-examination by the other party. A detailed discussion of this matter, and the Committee's resolution thereof, is contained in Section IV. C .5 of this Report.

The Committee directed the parties to serve Proposed Findings and Conclusions, and a supporting Brief, concerning the disputed areas following the conclusion of the evidentiary hearing. The parties have submitted these materials, and the Committee has fully considered them in arriving at preliminary Findings and Conclusions concerning the contested issues which are presented in this Report.

D. Conformity with Applicable Standards, Ordinances, and Laws

The Committee is required by Public Resources Code Section 25512(a)(2) to include Findings and Conclusions in this Report on the degree of conformity of the Applicant's proposed site and related facilities with "applicable local, regional, state, and federal standards, ordinances, and laws". Moreover, Public Resources Code Section 25514(a)(2) requires the Committee to include similar Findings and Conclusions in the Final Report. A tentative list of applicable standards, ordinances, and laws to which the proposed project must conform has been compiled and is set forth in Appendix I of this Report. The Committee will require the Staff and Applicant to assess conformity of the proposed project with these standards, ordinances, and laws in the course of hearings on this Report so that the Final Report will contain, to the fullest extent possible, Findings and Conclusions concerning the conformity of the proposed project with each of the appropriate standards, ordinances, and laws.

II. CONFORMITY TO DEMAND FORECASTS

A. Need for Additional Generating Capacity

1. Introduction

Public Resources Code Section 25512 requires the Committee to determine "[t]he degree to which each alternative site and related facility proposal designated in the [N]otice or presented at a hearing and considered by the [C]ommission is in conformity with ... the forecast of statewide and service area electric power demands pursuant to Section 25309...". The Commission's most recent forecast of statewide and service area electric power demands was adopted in March 1977. This matter is also known as "determining the need for the project".

2. Disagreement

At the Prehearing Conference, the Staff and the Applicant each submitted separate Statements containing proposed Findings and Conclusions on the area of Need. While these separate Statements contained various Findings and Conclusions that were similar, they nevertheless demonstrated certain basic disagreements.

First, and most significantly, Staff proposed to include language in the Findings and Conclusions which, while recognizing DWR's need for energy and thus the ultimate need for the proposed project, nevertheless indicated that the need for capacity could, in part, be met through altering operations and agreements governing existing or proposed facilities, such as the Hyatt-Thermalito hydroelectric facility or the proposed Reid-Gardner project (see Staff Prehearing Conference Statement, January 2, 1979, "Need/Demand Conformance",

proposed Findings 7 (second sentence), 8, 9, 10, 11, 18). DWR's proposed Findings and Conclusions in this regard were substantially similar to Staff's, with the exception that language questioning the need for capacity was deleted (DWR Position Paper on Need/Demand Conformance Issues, January 2, 1979). Second, the Staff Statement included language which DWR interpreted as mandating a change in the method of operating the State Water Project. Finally, the Staff Statement included language indicating that DWR's cost estimate of purchased power vs. self-generated power needed further verification (Staff Statement, January 2, 1979, Finding 15), and that DWR should provide detailed and verified data demonstrating the cost effectiveness of energy from the proposed project (Id., Finding 18 (a)). DWR's proposed Finding indicated that the cost differential levied the scales in favor of self-generated power and implicitly indicated that verified data had been submitted (DWR Position Paper, January 2, 1979, Finding 11).

3. Committee Resolution

The Committee, in its January 12 Hearing Order, decreed that the area of Need/Demand Conformance would not be adjudicated at the evidentiary hearing. The Committee based this decision on the fact that geothermal resources are a preferred technology, the fact that the issue is very broad with wide-ranging implications more appropriately dealt with in a CFM II or other generic proceeding, and the fact that both Staff and Applicant agree on the ultimate energy need for the proposed project.

In addition, the Committee notified the parties that it proposed to take official notice of the Commission Decision in the Sundesert Nuclear Project NOI (76-NOI-2, December 21, 1977) and the Decision in the AB 1852 proceedings (77-NL-1, March 1, 1978) insofar as they related to DWR's energy and capacity

needs. The Committee also requested the Staff to submit: 1) a listing of the data which DWR has submitted regarding the relative costs of purchased power and generated power; 2) a listing of the data which Staff feels is necessary to verify the cost differential alleged by DWR; and 3) a justification of why such data is needed. Staff submitted its response on March 1, 1979.

A description of the constituent factors in Committee's rationale used in arriving at its Findings and Conclusions on the area of Need/Demand Conformance is set forth in the following subsections.

a. Geothermal as a Preferred Technology

On March 22, 1978, the Commission adopted a policy to encourage and expedite the environmentally acceptable utilization of geothermal resource development.

The Commission's Geothermal Policy Report recognizes geothermal energy as a preferred technology for meeting electric power needs because: 1) it is indigenous to California; 2) its development offers a stimulus to the state's economy; 3) for dry steam resources, the environmental impacts and power plant technology are well understood; 4) geothermal power plants are relatively small (50-110 MW) and thus enable greater system reliability and flexibility; and 5) geothermal power plants may be planned and constructed in a shorter time frame than power plants using other fuels.

There is no disagreement as to the preferred status of geothermal resource development. Both the Staff and the Applicant indicated agreement with this policy in their separate Prehearing Conference Statements (Staff Statement, Finding 16; DWR Statement Finding 12).

b. Breadth of Issue

As stated in the Committee Hearing Order, the issue of Need/Demand Conformance is broad in scope. The breadth of this issue, and the issue itself, for present purposes, is related to sections 25512 and 25309 of the Public Resources Code.

Under section 25512, the Committee, in its Preliminary Report, is required to assess the degree to which a proposed project is in conformity with the "... forecast of statewide and service area electric power demands adopted pursuant to section 25309...". As recognized in the Staff's Position Paper submitted as written testimony at the evidentiary hearing, the most recent statewide forecast, adopted in March 1977, "...does not provide an electricity forecast for DWR as an entity separate from the utilities" (Staff Position Paper on Need, January 2, 1979, p. 2).

DWR has submitted data for the Commission's second Biennial forecast proceedings* which, by their very nature, are generic and deal with issues broader than those typically encountered in the course of an NOI proceeding. In fact, the Staff's written testimony continues:

"No attempt has been made at this time to assess DWR's forecasted energy and capacity requirements. However, the Commission staff intends, as part of the Biennial Report forecast proceeding, to independently analyze the DWR's CFM II forecast of peak demand and energy and then recommend a DWR forecast by the Commission." (Id., p. 2; emphasis in original).

Thus, at this point, the only means by which to assess the need for DWR's proposed project is to consider the forecast of statewide energy

*Also known as Common Forecast Methodology Proceedings II (CFM-II).

demands as represented by the collective forecasts for the various utilities as adopted by the Commission in March 1977. By this standard, the Committee believes the project is needed, as discussed below. Staff agrees, as set forth in subsection c, following, that the proposed project is ultimately needed and that the broad area of forecast requirements will be dealt with in Biennial Report proceedings in the near future, before a final decision on the AFC.

c. Need for Energy

The Staff has clearly stated that it does not question DWR's ultimate need for energy from the proposed project, but rather takes issue only with DWR's need for capacity (January 9, 1979 Transcript, pp. 153-72; January 25, 1979 Transcript, pp. 319-20). In this regard, the Staff feels that more analysis of DWR's need for capacity is required.

As stated above in subsection b, the Committee feels that this question would be most properly resolved in the context of CFM-II or Biennial Report proceedings. Moreover, as stated in subsection d, following, the Commission has already, in the course of other proceedings, adopted Findings concerning DWR's need for both energy and capacity; no reason to reject these Findings has been shown.

d. Officially Noticed Matters

In its January 12 Hearing Order, the Committee notified the parties that it would take official notice of the Commission Decision in the San Diego Gas and Electric Company's Sundesert NOI (76-NOI-2) and the Commission Decision in the AB 1852 proceedings (77-NL-1). No one objected to the admission of these decisions into the evidentiary record (January 25, 1979 Transcript, pp. 315-18).

The Sundesert NOI Decision (76-NOI-2, item 7) deals with DWR's requirements for energy, capacity, and reserve margins:

"7. The California Department of Water Resources requires both energy and capacity to meet the needs of the State Water Project.*** Thus, there are grounds for DWR owning additional resources to assure a reliable long-term supply of capacity and energy... . The record indicates that the Department of Water Resources will have an energy deficit beginning in 1983 and reserve margins below ten percent in 1984 and 1986. Addition of capacity equivalent to DWR's proposed 285 megawatt share of Sundesert would leave DWR with large peak reserve margins, but still with substantial energy deficits."

The AB 1852 Decision (77-NL-1, section III.E) reads in part:

"The Department of Water Resources is another large scale purchaser of peak capacity and energy. ***Generally speaking DWR is moving toward the ownership of more of its resources. In this sense it could use three to four hundred megawatts as early as 1983 when certain purchase power arrangements run out. ***In addition, the geothermal resources...at the Geysers can replace purchase power as contracts end in 1983 and beyond."

Thus, Findings adopted by the Commission recognize DWR's need for both energy and capacity, as well as the viability of potential geothermal development by DWR to replace purchase power lost through expiration of contractual arrangements. The Committee deems the foregoing combination of factors sufficient, at this time, to demonstrate a need for the proposed project for the purposes of the NOI.

B. Preliminary Committee Findings and Conclusions

The Staff and the Applicant submitted separate Prehearing Conference Statements concerning the area of Need/Demand Conformance. Several of the Findings and Conclusions contained in these separate Statements were similar,

and the Committee has adopted them, as preliminary, to the extent appropriate. The Committee has also posed various other Findings and Conclusions, or chosen between the versions submitted by the parties in certain instances to reflect conformity with its decision that no adjudication of this area is required in the NOI proceedings.

The Committee's preliminary Findings and Conclusions on the area of Need/Demand Conformance follow:

Preliminary Findings and Conclusions

NEED/DEMAND CONFORMANCE

Findings

1. If constructed according to the present schedule, the Bottle Rock power plant will begin commercial operation in 1983. [same version as Staff's proposed Finding 1, Applicant's proposed Finding 1].
2. The Bottle Rock power plant will have a net generating capacity of about 55 megawatts. [same version as Staff's proposed Finding 2, Applicant's proposed Finding 2].
3. The Commission's adopted "most likely" demand forecast does not provide a load forecast for DWR as an entity separate from the utilities. The Applicant's CFM-II submission to the Commission provides an alternative basis for assessing the need for and the reasonableness of the Bottle Rock project as a resource in meeting the Applicant's forecasted loads. [same version as Staff's proposed Finding 3, Applicant's proposed Finding 3].
4. The Bottle Rock project is included in the Applicant's resource plan for 1983. [same version as Staff's proposed Finding 4, Applicant's proposed Finding 4].
5. The Applicant needs electrical capacity and energy in order to meet the pumping requirements of the State Water Project (SWP). [same version as Staff's proposed Finding 5, Applicant's proposed Finding 5].

6. The operation of the SWP power system differs from the normal electrical utility system in two major respects:
 - a. DWR has considerable control over the timing and magnitude of the SWP load (capacity) requirements.
 - b. Through exercise of this control the SWP experiences its greatest energy and capacity needs during the evening and night time hours (off-peak) and its smallest capacity and energy needs during daytime hours (on-peak). [same version as Staff's proposed Finding 6, Applicant's proposed Finding 6].
7. According to its CFM-II estimates, DWR will require 693 megawatts of on-peak capacity for SWP pumping operations in 1983, increasing to 992 megawatts by 1991, including allowances for contingencies and reserves. [same version as Applicant's proposed Finding 7, Staff's proposed Finding 7, first sentence only].
8. DWR's CFM-II submission indicated that 8,058 gigawatt-hours of energy will be required for SWP pumping operations in 1983, increasing to 9,435 gigawatt-hours by 1991. [same version as Applicant's proposed Finding 8, Staff's proposed Finding 12].
9. Even with the proposed Bottle Rock project and the energy which could be supplied by the Hyatt-Thermalito and Reid Gardner projects, DWR will still need large amounts of energy beginning in 1983. Accordingly, the Applicant needs the energy to be supplied by the Bottle Rock project. [same version as Applicant's proposed Finding 9; first sentence varies from Staff's proposed Finding 13; second sentence same as Staff's proposed Finding 13].

10. The Commission has determined, in its Decision in the Sundesert NOI (76-NOI-2), that DWR needs energy and capacity to meet the requirements of the State Water Project.
11. The Commission has determined, in its Decision in the AB 1852 proceedings (77-NL-1), that geothermal resources at the Geysers can replace a portion of DWR's purchased power as contracts end in 1983 and beyond.
12. The most apparent alternative source for supplying the energy which would be provided by the Bottle Rock project would be additional energy purchases from other utilities. [same version as Staff's proposed Finding 14, Applicant's proposed Finding 10].
13. The Applicant has estimated that power from the Bottle Rock project would cost 27.4 mills per kilowatt hour, whereas the cost of purchasing off-peak energy from Southern California Edison would be about 45 mills per kilowatt hour in the mid-1980's. These figures, which need further verification, preliminarily indicate that if the energy to be provided by the Bottle Rock project were obtained by means of energy purchases from other utilities, the Applicant would probably suffer a significant economic penalty. [same version as Staff's proposed Finding 15; variation of Applicant's proposed Finding 11].
14. The policy of the California Energy Commission is to encourage the accelerated development of geothermal resources. [same version as Staff's proposed Finding 16, Applicant's proposed Finding 12].

15. Geothermal power plants have a relatively short construction lead time, relatively high annual capacity factor, and provide for potential fossil fuel savings. [same version as Staff's proposed Finding 17, Applicant's proposed Finding 13].
16. At or prior to the AFC filing, the Applicant shall provide verified and detailed data demonstrating the relative merit and cost comparison of energy from the proposed project as compared to the cost of purchased power.

Conclusions

1. The Applicant shall provide the information specified in Finding 16.
2. If constructed and operated in compliance with applicable standards, ordinances, and laws, a geothermal power plant would be an acceptable means of supplying 55 MW of energy to meet a portion of the requirements of the State Water Project.
3. No adjudication of this issue is necessary during the NOI.

1. Points of Clarification

In view of the matters officially noticed (see Findings 10 and 11), the Committee has deleted Staff proposals dealing with DWR's need for capacity and alternative suggestions for dealing with capacity questions (Staff's originally proposed Findings 7 (second sentence), 8, 9, 10, 11, 13).

The Committee has accepted Staff's proposed Finding 15 in lieu of Applicant's proposed Finding 11 regarding the need for verification of cost comparison data (see Findings 13 and 16 above). Although DWR has stated that

this data is available to Staff, Staff's request that verification of the cost differential in question "... need not consist of anything more extensive than specific documentation of DWR's purchase power estimate from potential area suppliers" appears reasonable (Staff Response to Committee Order, March 1, 1979). In its November 17, 1978 response to additional data requests which were entered into the evidentiary record (January 25, 1979 Transcript, p. 319), DWR briefly states the method used to derive the figure for cost comparisons of purchase power vs. self-generated power, but does not provide the assumptions or calculations requested:

Staff Question 2c:

"If the Department could meet the on-peak energy requirements for SWP by running Hyatt-Thermalito at a higher capacity than the planned 250 MW, what would be the cost to the Department of purchasing additional off-peak power to meet SWP needs? Provide all assumptions utilized in deriving such costs and sample calculations."

Applicant Response to 2c:

"The price of additional off-peak energy is not now known as contracts for purchasing such energy have not been negotiated. However, the Utilities have filed proposed off-peak rates under the Department's EHV Contract with FERC. The rate proposed by Southern California Edison Company (SCE), as an example, is essentially based on incremental costs plus 15 percent. It can readily be derived from SCE's CFM-II submittal to the Energy Commission that future fuel costs would result in rates of approximately 39 mills/kWh in the mid-1980s for oil fuel. Therefore, the cost of off-peak energy, based on SCE's proposal, would be about 45 mills per kWh in the mid-1980s."

Staff Question 2d:

"How would the costs of obtaining such additional off-peak power compare with the costs of energy to be provided by the proposed project? Provide assumptions and sample calculations."

DWR Response to 2d:

"As shown in its CFM-II submittal, the Department must purchase substantial amounts of off-peak energy. If Bottle Rock Power Plant were constructed by a utility other than the Department, the Department would have to purchase additional on-peak and off-peak energy. The estimated cost of power from Bottle Rock is

27.4 mills per kWh. The estimated cost of purchases would be at least 45 mills per kWh based on the SCE data referred to above. The estimated cost for the 372 GWH per year output of Bottle Rock Power Plant is \$10,186,000 while purchasing the same amount of energy off-peak at the 45 mill figure would cost \$16,740,000. In addition, if the capacity is not needed by the Department on-peak, it probably could be sold to other utilities."

Although the data referenced in the CFM-II and FERC submittals may answer Staff's concerns, the Committee feels that since the Applicant has the burden of demonstrating the need for the facility, and responding fully to reasonable Staff requests made in the public interest, no substantial difficulty would be caused by submitting the detailed and verified data properly requested by Staff. Staff has stated their willingness to meet with Applicant in this regard, and the Committee expects that this matter will be resolved as expeditiously as possible.

III. SITE RELATED ISSUES

A. Introduction

In addition to determining the degree of conformity with applicable standards, ordinances, and laws, Public Resources Code Section 25512 requires that a Preliminary Report contain Findings and Conclusions with regard to the merit of each site and related facility designated in the Notice or considered in the Notice of Intention proceeding.

Public Resources Code Section 25540 eliminates the requirement for geothermal power plant Notices to contain alternate sites. As noted in sections I.B.2., I.C.5. and .6., and III.C.3, the Applicant had proposed only one site for its Bottle Rock geothermal project. The California Department of Fish and Game, however, proposed an alternative location for the power plant, within the general site area, at the Prehearing Conference (January 9, 1979 Transcript, pp. 94-8). The Committee notified the parties in its January 12 Hearing Order to be prepared to respond to DFG's concerns*; at the evidentiary hearing, however, DFG withdrew its objections to the site proposed by Applicant (January 25, 1979 Transcript, pp. 302-04). There was thus no need to consider this alternative plant location during the NOI proceedings at this point, and the Findings and Conclusions set forth in the following subsections speak to the merits of the plant location and general site proposed by Applicant for its Bottle Rock geothermal power project.**

*Staff's and Applicant's prepared responses are set forth in Appendix E of this Report.

**A more detailed discussion of this matter appears in Section III.C.3, following.

B. Air Quality

1. Introduction

In determining the conformity of the proposed power plant to applicable air quality standards, ordinances, and laws, the Committee must consider: 1) the ambient (background) air quality within the air basin; and 2) the amounts and impacts of the various emissions from the power plant at the time of operation.

To examine the ambient air quality, the Committee must review monitored data and projections of air quality at the time the plant commences operation and measure the results against national and state ambient air quality standards. Non-attainment of the air quality standards in the air basin in question, meaning that the air is more polluted than allowed by law, imposes additional requirements for the granting of a permit. Generally, these requirements are: 1) that there be emission reductions (tradeoffs, offsets) elsewhere in the air basin, so that even with the proposed new source there will be an overall improvement (net benefit) in air quality in the basin, and there will continue to be reasonable progress toward meeting the air quality standards; and 2) that the project employ the best available control technology.

In addition to the ambient air quality review, which considers the condition of the air within the basin where the power plant is proposed to be built, the Committee must consider a new source review examination of the amounts of emissions from the power plant itself to assure that: 1) they will not violate or prevent attainment of the air quality standards at the time the plant commences operation; and 2) that they are equal to or less than the emissions limitations for a new source.

2. Discussion

a. General

On January 23, 1979, the Energy Commission and the California Air Resources Board (ARB) adopted a joint policy statement which "sets forth a procedure for the expeditious approval of needed power plants in a manner that fully preserves the integrity of California's air quality program." The Commission will be explicitly guided by this policy statement in adopting amended NOI/AFC regulations governing the siting of power plants using fuel types other than geothermal, and in other actions affecting compliance with Air Quality laws. The Commission will be guided generally by the joint agreement in adopting geothermal power plant siting regulations.* The ARB shall be similarly guided in adopting its revised model New Source Review rule to be used by local districts and in any other actions affecting the siting of new power plants. The joint agreement does not affect proceedings on the UWR Bottle Rock Notice, but should be applicable to the AFC if the Notice is approved.

Next, the applicability of U.S. Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) remains unsettled. The Committee understands that federal, state, and local authorities are engaging in a series of conferences directed toward clarifying this issue**, among others. The proposed Findings and Conclusions thus take the

*Some aspects of the joint agreement, especially as they relate to alternative sites, are not appropriate to the geothermal power plant siting process. The CEC and the ARB hope to develop a joint agreement specific to geothermal power plant siting in the near future.

**In addition, this Committee will recommend that the full Commission direct Staff to prepare a policy issue paper and that, after consideration of the paper, adopt a policy concerning the applicability of PSD regulations to H₂S emissions from geothermal power plants.

unsettled nature of PSD applicability into consideration, where appropriate.

b. Prehearing Conference - Air Quality Issues

The Staff and the Applicant initially submitted separate Statements containing proposed Air Quality Findings and Conclusions. The Lake County Air Pollution Control Officer (LCAPCO) participated substantially regarding formulation of proposed Air Quality Findings and Conclusions at the Prehearing Conference (January 9, 1979 Transcript, pp. 174-256) and, as a result, the Applicant and the Staff resolved their differences and submitted Joint Proposed Air Quality Findings and Conclusions on January 19, 1979 which the LCAPCO apparently felt were acceptable.

Several key points clarified at the Prehearing Conference are as follows:

- o The LCAPCO, Mr. Zalusky, will not require an additional air quality modeling analysis (other than the Cobb Valley study referred to in Finding 14, following) prior to deciding whether to issue an Authority to Construct because he believes that a valid rough terrain model does not exist, and that the assumptions utilized in such a model would not necessarily be valid (January 9, 1979 Transcript, pp. 181-203).
- o The LCAPCO is in favor of tracer studies, even though he feels that modeling is not necessary at present.
- o The Staff will submit a report concerning the status of applicable New Source Review rules in its comments on this Report (January 9, 1979 Transcript, p. 205; Finding 16, following).

- o The ARB has drafted a model New Source Review rule which, it is anticipated, will be included in the State Implementation Plans of the local APCDs. The local districts will have until May 31, 1979 to adopt the new rule and, if not, then the ARB will amend local APCD rules in conformity with the revised New Source Review Rule (January 9, 1979 Transcript, pp. 207-08).
- o The LCAPCO believes that high levels of H₂S abatement in the steam transmission line cannot be achieved through mechanical means alone. The LCAPCO and various steam suppliers will soon embark upon research to determine the degree of abatement that can be achieved during periods of steam stacking. The LCAPCO and steam developers are thus exploring the alternative of chemical abatement of H₂S emission in the steam transmission lines. The LCAPCO will adopt steam stacking rules after the degree of abatement is determined (January 9, 1979 Transcript, pp. 222-4, 234-5).
- o Lake County is currently in attainment status for all pollutants for which there is a National Ambient Air Quality Standard (NAAQS) (January 9, 1979 Transcript, pp. 239-40).
- o LCAPCO determines compliance with air quality laws by assessing impact at receptor sites, not by measuring actual emissions from a power plant (January 9, 1979 Transcript, p. 241).

In order to fulfill its responsibility to determine the proposed project's conformity with air quality standards, ordinances, and laws, the Committee must first identify those which are applicable. A list of laws

tentatively deemed applicable is included in Appendix I of this Report. The Committee will require the Staff and Applicant to assess conformity of the proposed project with these standards, ordinances, and laws in the course of the NOI proceedings, before issuance of a Final Report.

3. Proposed Findings and Conclusions

Following are the Proposed Findings and Conclusions submitted jointly by the Applicant and the Staff following the Prehearing Conference:

PROPOSED FINDINGS AND CONCLUSIONS
AIR QUALITY

Findings

1. The Lake County Air Pollution Control District (LCAPCD) Rule 411 limits emissions of particulate matter to whichever is lesser of:

- a) 0.2 grains per standard cubic foot; or
- b) 40 pounds per hour.

2. Particulate emissions from the Bottle Rock plant during normal power plant operation will be substantially less than either 0.2 gr/scf or 40 lb/hr.

Particulate emissions should not exceed 66.7 tons/year.

3. Assuming that emissions of H_2S during periods of steam stacking are required to be reduced by 90%, particulate emissions during such periods will be reduced to 1.5 lbs/hr. Operating under such a limitation will assure compliance with Section 411. However, the Applicant has not established that the steam supplier will operate under this limitation. Accordingly, the Applicant has agreed to specify the control system (or systems) to be used or to provide other information which will verify that its steam supplier will be able to comply with Section 411 at or prior to the time of the AFC filing.

4. LCAPCD Rule 412 limits emissions from any sulfur recovery unit producing elemental sulfur to:

- a) 10 ppm H_2S by volume;
- b) 100 lbs/hour of sulfur compounds calculated as SO_2 .

5. The Applicant has proposed to employ a Stretford Unit to remove sulfur from the H_2S in the noncondensable gas stream. The LCAPCD Acting Air Pollution Control Officer has interpreted Rule 412 as applicable to the Stretford Unit.

Airborne emission rates and concentrations from the Stretford Unit are not presently known. The Applicant has indicated that it will supply such information as soon as the data to be obtained from the operation of the surface condenser and Stretford Unit on the Pacific Gas and Electric Company's Unit 15 can be made available. In no event should this information or supplemental information as to the expected Stretford Unit emission rates from the Stretford supplier be submitted later than the date of the AFC filing for the Bottle Rock plant.

6. A general emissions limitation is contained in LCAPCD Rule 430, which prohibits the discharge of any contaminant in an amount which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or which causes injury or damage to business or property. Further, Rule 430 states that emissions in quantities which cause a state or federal ambient air quality standard to be exceeded shall be a violation of Rule 430.

7. Federal New Source Review requirements apply to any new source which will emit 100 tons/year or more of any pollutant for which there is a National Ambient Air Quality Standard (NAAQS).

8. During normal power plant operation the Bottle Rock plant will not emit 100 tons/year of any pollutant for which there is a NAAQS. When the information specified in Finding 3 is provided, Staff will determine if the steam release valve will emit more than 100 tons/year of particulate matter; the steam release valve will not emit 100 tons/year of any other pollutant for which there is a NAAQS.

9. LCAPCD Rule 602 requires an air quality analysis for any source which the APCD estimates will emit more than 20 lb/hr or 150 lb/day of any pollutant for which there is a local, state, or federal ambient air quality standard (AAQS). The APCD must deny an authority to construct for such a source unless

the air quality analysis indicates that emissions from the source will not cause a violation or result in a measurable contribution to the continued violation of an AAQS, and provided that the best available control technology (BACT), as defined by the LCAPCD, will be used on the emitting equipment. Further, Rule 604 allows the permitting authority to require an air quality analysis for a source which will emit less than 20 lb/hr or 150 lb/day of any pollutant for which there is an AAQS if the emissions from the source might result in a violation or measurable contribution to the continued violation of an AAQS. Any analysis required pursuant to Rule 602 or 604 must consider existing state and local control strategies.

10. The NSCAPCD, an adjacent district, adopted Rule 455(b) in June, 1978. Rule 455(b) is an H₂S control strategy requiring specified reductions in H₂S emissions from new and existing sources to achieve a gradual reduction in ambient H₂S concentrations so that the H₂S ambient air quality standard will be attained and maintained as of January 1, 1985.

11. If the analysis performed pursuant to Rule 602 or 604 indicates the source will result in the violation or the measurable contribution to the continued violation of an AAQS, that source may still be permitted if emissions offsets, in addition to those reductions required pursuant to existing control strategies or enforceable permit conditions, are obtained in such an amount that a "demonstrable basin wide air quality benefit" will result.

12. The state AAQS for H₂S is 0.03 ppm. This standard may not be equalled or exceeded, although measurements in the vicinity of the Bottle Rock plant show that the standard has in fact been exceeded several times. The precise sources which have contributed to such violations are unknown.

13. The Applicant has not performed an adequate air quality impact analysis as referred to in Finding #9 for the purposes of demonstrating compliance with applicable LCAPCD Rules. Once this analysis is completed, the APCD and the Committee shall determine whether H₂S emissions from the Bottle Rock plant will result in a violation of, or measurable contribution to the existing violation of, the H₂S standard.

14. The Applicant is participating in a joint air quality and meteorological data gathering study in the Geysers-Cobb Valley area for defined meteorological scenarios and to provide an adequate air quality impact analysis which will allow the APCD and the Committee to make the determination referred to in Finding 13 above at or prior to the time of the AFC filing. The Staff believes that the Applicant should not have to conduct data gathering studies, in addition to those specified in the Cobb Valley Study, for the purposes of the Commission's review of the Bottle Rock project. Furthermore, the Staff and Applicant agree that an air quality modeling analysis should not be required to make a determination of compliance with applicable air quality requirements during the NOI or AFC.

15. The LCAPCD has stated in publicly noticed workshops that additive effects from a new source which are less than 5-10 ppb will not be considered a "measurable contribution". Section 235 of the LCAPCD rules defining measurable contribution reads as follows: "The contribution (calculated, based upon modeling or measurement) of nitrogen oxides, organic gases or any pollutant to the ambient air in the basin or sub-basin, for which there is a local, state, or federal standard which can be resolved by the best reasonably available analytical methodology. Measurements shall be made no closer than the property line."

16. The scheme for air quality new source review (NSR) in California is currently undergoing substantial revision. This is as a result, in large measure, of the requirement of the Federal Clean Air Act Amendments of 1977 that a revised State Implementation Plan (SIP) (which makes provision for attainment of the various NAAQS by specified dates in 1982 or 1987) be prepared and submitted to EPA by January 1, 1979. This deadline was not met. The State Air Resources Board (ARB) is in the process of reworking the existing NSR rules. Although H_2S is not an NAAQS for which SIP revisions must be prepared, the evolving NSR revisions will affect the regulatory process for the siting of geothermal power plants. Moreover, it is Staff's understanding that the ARB is analyzing the manner in which the ARB's model control strategy for H_2S (much of which has been incorporated into NSCAPCD Rule 455) should interact with NSR for all proposed new geothermal power plants in the Geysers area. Accordingly, at the time it submits its comments on the Preliminary Report for this proceeding, the Staff shall also submit a report indicating the status of applicable NSR rules.

17. The steam supply for the proposed facility will be approximately 1,000,000 lbs/hr with an H_2S content of 225 ± 125 ppm. This would result in a total flow rate (uncontrolled) of approximately 100-350 lbs/hr.

18. Given the characteristics of the steam supply, the Applicant will have to abate H_2S emissions during normal operation by at least 97% to meet the 100 g/MWh limitation, and by better than 98% to meet a 50g/MWh limitation. These percentages are only relevant to determining whether applicable emissions limitations have been met. The results of the air quality impact analysis may indicate that even more stringent control of project H_2S emissions may be required in order to comply with applicable NSR rules.

19. The Applicant proposed to abate H_2S emissions with a surface condenser and Stretford Unit. A Stretford Unit, if correctly sized, should abate 99+ percent of the H_2S which reaches the unit in the gas stream.

20. Applicant has proposed to use a Stretford Unit with an H_2S abatement capacity of 350 pounds per hour. This unit appears to be adequately sized for the Bottle Rock plant.

21. The amount of H_2S which reaches the Stretford system is dependent on the amount of H_2S which the surface condenser is able to "partition" out of the steam and into the gas stream.

22. If the surface condenser partitions less than 97 percent of the H_2S into the gas stream, the H_2S remaining in the stream condensate will require treatment if the plant is to meet the 13.2 lb/hr limitation, or the limitation as determined by the air quality analysis which is required to meet NSR requirements, whichever is stricter.

23. The partitioning efficiency of the surface condenser proposed is not presently known.

24. The Pacific Gas and Electric Company's Geysers Unit 15 is the first Geysers power plant utilizing a surface condenser scheduled to begin operation. Unit 15 is scheduled to begin operation in early 1979.

25. Because the ability of the Bottle Rock plant to comply with applicable H_2S emission limitations is dependent on the partitioning efficiency of the surface condenser, the Applicant has agreed to provide, prior to or at the time of the AFC filing, either:

- a) sufficient operating data from Unit 15 to determine, with reasonable certainty, that the Stretford Unit's performance efficiency and the partitioning efficiency of the surface condenser will be sufficient to meet H_2S emissions limitations as specified in finding #22; or,
- b) specific proposals for condensate treatment systems which will be installed prior to commercial operation of the Bottle Rock plant in the event that the operating data from Unit 15 indicates that the partitioning efficiency of the surface condenser is not sufficient to meet H_2S emissions limitations as specified in finding #22 at the Bottle Rock plant.

26. The steam supplier (McCulloch) proposes to stack the steam, during plant shutdowns, through a bank of rock mufflers located near the plant site. The Applicant has stated that stacking will be controlled by manual or automatic well shut-in. The Applicant has agreed to provide detailed information on the method of control during steam stacking at or prior to the time of the AFC filing.

27. The steam supplier has not supplied information demonstrating that the manual and automated valve shut-in system can achieve the necessary level of H_2S abatement in order for H_2S emissions from the steam release valve not to result in a "measurable contribution" to an existing violation. Accordingly, the Applicant has agreed to obtain and provide from the steam supplier, at or prior to the time of the AFC filing, detailed information demonstrating that the manual and automated valve shut-in and/or supplemental systems will reduce H_2S emissions to the level of abatement necessary not to result in a "measurable contribution."

28. Clyde B. Eller, Director of the Enforcement Division, Region IX, of the Environmental Protection Agency, has stated that Federal Prevention of Significant Deterioration Rules may apply to geothermal power plants and presumably to the steam release valve. While Staff acknowledges the reasoning behind the the Director's argument, it does not agree. Even if the Applicant were subject to federal PSD requirements, these rules would simply require the use of BACT, because there is no NAAQS for H_2S , and hence no "allowable increment" with respect to that pollutant. Furthermore, Staff and Applicant believe that reduction of the Bottle Rock plant's emissions through the proposed control systems would constitute BACT.

29. Federal PSD rules only apply to sources which have a potential to emit 250 tons/year of a regulated pollutant. Neither the Bottle Rock power plant nor the steam release valve have a potential to emit 250 tons/year of any pollutant other than H₂S. Hence, PSD rules would not apply to these other pollutants.

30. The LCAPCD has recently adopted H₂S emissions limitations for geothermal power plants. The Rule reads as follows:

"Section 421.2A Power Plants

" 1. All Geothermal Power Plants for which an Authority to Construct Permit is initially issued before January 1, 1979 shall emit no more than 175 grams of hydrogen sulfide per gross megawatt hour until January 1, 1990.

" 2. All Geothermal Power Plants for which an Authority to Construct Permit is initially issued on or after January 1, 1979 shall emit no more than 100 grams of hydrogen sulfide per gross megawatt hour until January 1, 1990.

" 3. All Geothermal Power Plants for which an Authority to Construct Permit is initially issued on or after January 1, 1983 shall emit no more than 50 grams of hydrogen sulfide per gross megawatt hour until January 1, 1990. The APCO shall, after reviewing air quality data, the extent and rate of geothermal development and the availability of control technologies, suggest that this rule be confirmed or modified by the Board at a properly noticed public hearing to be held in 1981.

" 4. All Geothermal Power Plants shall by January 1, 1990 emit no more than 50 grams of hydrogen sulfide per gross megawatt hour. However, this rule shall be subject to confirmation at a properly noticed hearing to be held in 1987."

31. If power plant emissions are limited to 13.2 lb/hr H₂S, the Bottle Rock plant will comply with the provisions of Rule 421.2A(2).

Conclusions

1. The Bottle Rock plant will comply with LCAPCD particulate emissions limitations during the periods of normal operation.
2. Emissions from the Bottle Rock plant will not require Federal New Source Review.
3. The sulfur handling capacity of the Stretford Unit proposed for use on the Bottle Rock plant is adequate to treat the H₂S which may be expected to reach the unit.
4. Both the Bottle Rock plant and the steam release valve will comply with Federal PSD requirements, assuming such requirements apply.
5. The Applicant shall provide the information specified in Findings Number 3, 5, 14, 25, 26, and 27.
6. Staff shall report to the Committee as specified in Finding No. 16.
7. Based on the available information, it cannot yet be determined whether the Bottle Rock plant will comply with all applicable air quality standards and regulations.
8. No adjudication of this issue is necessary in the NOI.

4. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions. The above version of the joint proposal differs from the original submissions, in which the parties offered separate air quality Findings and Conclusions. The parties, with the participation of the Lake County Air Pollution Control Officer at the Prehearing Conference, reached agreement as reflected above (1/9/79 Transcript, pp. 173-256). The revised version of the joint Findings and Conclusions was submitted on January 19, 1979 and offered at the evidentiary hearing (1/25/79 Transcript, pp 296-9).

The Committee has altered the language originally contained in the last sentence of Finding 14, above, in order to avoid the implication that the Applicant and the Staff could, by mutual agreement, bind the Committee regarding the necessity of Applicant submitting an air quality modeling analysis in the future (see 1/9/79 Transcript, p. 201).

C. Other Site-Related Issues

1. Introduction

In addition to air quality considerations, the acceptability of a proposed site depends upon the possible impacts that constructing and operating the proposed facility may have on human and ecological values in the area. Thus, the Committee must consider factors such as impacts on soils and hydrology, socio/economic concerns, viability of mitigation measures, and the nature and scope of the overall effects on the proposed project area. The following Findings and Conclusions treat these factors on a subject by subject basis.

2. Proposed Findings and Conclusions

The Applicant and the Commission Staff proposed Joint Findings and Conclusions on the areas of Biological Resources, Civil Engineering/Solid Waste Management, Cultural Resources, Hydrology, Noise, Socioeconomics, Soils, Water Quality, and Water Resources (January 9, 1979 Transcript, pp. 67-134). The parties offered written testimony and statements of position supporting these Proposed Findings and Conclusions at the evidentiary hearing (January 25, 1979 Transcript, pp. 281-94).

With the exception of the Biological Resources area, no one has substantially challenged or objected to these Findings and Conclusions. As noted in previous sections of this Report and explained in subsection 3, following, the Department of Fish and Game initially questioned the suitability of the proposed location for the power plant at the Prehearing Conference. At the evidentiary hearing, however, DFG withdrew their objections and expressed affirmative support for the proposed Joint Findings and Conclusions, and the proposed power plant location, as amended at the Prehearing Conference.

The joint Proposed Findings and Conclusions on Biological Resources and the other eight areas enumerated above follow:

PROPOSED FINDINGS AND CONCLUSIONS
BIOLOGICAL RESOURCES

Findings

1. *The following laws govern the preservation and protection of biological resources:*

- *Federal Endangered Species Act of 1973 and implementing regulations.*
- *Ecological Reserve Act of 1968 and implementing regulations, Fish and Game Code sections 1580-1584.*
- *California Species Preservation Act of 1970, Fish and Game Code sections 900-903.*
- *California Endangered Species Act of 1970, Fish and Game Code sections 2050-2055.*
- *Fully Protected Species Act, Fish and Game Code sections 3511, 4700, 5000, and 5515.*
- *Native Plant Protection, Fish and Game Code sections 1900-1913.**

2. *The American Peregrine Falcon is an endangered species by designation of California and Federal law.*

3. *The American Peregrine Falcon has been observed in the Geysers-Calistoga Known Geothermal Resource Area.*

4. *No active breeding sites for the American Peregrine Falcon are known to exist at the Francisco leasehold.*

5. *The Bottle Rock site is not included within the federally proposed "Critical Habitat Zone" for the American Peregrine Falcon.*

6. *There are no rare, threatened, or endangered wildlife species known to exist at the Francisco leasehold.*

7. *The Golden Eagle and the Ringtail are fully protected species by designation of California law.*

* not contained in original Joint Statement; added by Committee in conformance with Staff response of February 5, 1979 (see Appendix D).

8. *The Golden Eagle and the Ringtail have been observed in the Geysers-Calistoga Known Geothermal Resource Area. No sighting of the Golden Eagle within the Francisco leasehold has been reported.*
9. *The Francisco leasehold is not known to be a significant breeding or feeding area for either the Golden Eagle or the Ringtail.*
10. *No rare or endangered plant and no wildlife species of special concern are known to exist at the Francisco leasehold.*
11. *Two plant species of special concern, the St. Helens fawn lily (Erythronium helenae) and Lomatium repostum, a member of the carrot family, are found on the leasehold, but are not reported in areas subject to direct disturbance by the project.*
12. *The Applicant has proposed to undertake mitigation measures for the protection and preservation of biological resources. These mitigation measures are specified in the NOI on pages V-16 and pages 14-15 under Biological Resources, and include the erosion control measures specified in the Proposed Findings and Conclusions under "Soils".*
13. *Areas of critical concern which may contain unique habitats and which therefore may need special protection are known to exist within the Francisco leasehold and the proposed transmission corridor.*
14. *The riparian, creek, springs, seep areas and the relic stands of native coastal, prairie or meadow on the leasehold have been identified as areas of critical concern. The meadow, springs and seep areas are of vital importance to wildlife survival during dry seasons and should be protected from destruction or degradation. There are other grassland areas on the leasehold which Staff and Applicant may later identify as areas of critical concern. Any such areas and the basis for their classification shall be specifically described in the AFC filing.*

15. The Department of Fish and Game has indicated that it considers the proposed power plant site, ponderosa pine - mixed evergreen forest, to be valuable wildlife habitat. Development of the proposed site will require acceptance of the loss of this habitat. However, if adequate mitigation measures are implemented, the losses associated with the proposed site are not so severe as to render the project unacceptable.

16. The Applicant has agreed to consult with the Department of Fish and Game and to develop detailed mitigation measures for wildlife habitat loss associated with the development of the steam field and the power plant site for submission to the Commission prior to or at the time of the AFC filing. This submittal will include a detailed discussion of how the cumulative impacts of development of the power plant site and steam field can be mitigated.

17. On the leasehold in the vicinity of the proposed power plant site is an intermittent tributary to High Valley Creek. Further downstream, High Valley Creek becomes a year-round stream. This creek along with Alder Creek located east of the leasehold, empty into Kelsey Creek. This drainage system into Clear Lake is an important trout spawning area which should be carefully protected from siltation and accidental spills associated with site development and power plant operations.

18. The Applicant's proposal to implement the measures specified in Finding No. 3, under "Soils", and to provide a retention barrier around the plant site to contain accidental spills, and an on-site drainage system to collect and dispose of spill materials, should provide protection to off-site wildlife habitat and spawning areas in High Valley Creek. Depending on the final design of the facility, the Applicant has agreed to specify the necessary mitigation measures prior to or at the time of the AFC filing.

19. Eight wildlife species of recreational value, in addition to trout, are known to exist in or near the Francisco leasehold.

20. Loss of habitat from the project will include some loss of breeding and feeding areas for some of these recreational species.

21. At present, the leasehold does not support significant quantities of commercially important plant species.

22. Vegetation stress has occurred from cooling tower drift at the Geysers. Field and laboratory studies have tentatively implicated borates as a prime cause of these impacts. The Applicant has proposed to provide a drift eliminator system for the cooling tower which specifies a drift loss rate of 0.002% of the circulating water rate. Accordingly, the operation of the proposed project is less likely to cause vegetation damage resulting from the boron in cooling tower drift than other existing units in the Geysers.

23. As soon as development at the project site has begun, it will be necessary for the Applicant to initiate several monitoring studies to evaluate the actual impact of the project on biological resources. These monitoring programs should consist of the following:

1. the water monitoring program referred to in Finding No. 7, under "Water Quality"; and
2. evaluation of the success of all mitigation measures which are implemented in connection with the construction and operation of the proposed project.

The Applicant agrees to provide a detailed discussion of the nature of the monitoring programs which it will conduct prior to or at the time of the AFC filing.

24. Both the U.S. Fish and Wildlife Service and the California Department of Fish and Game have stated concern over the acceptability of cumulative impacts from this and other geothermal projects. This is not an issue which can or should be resolved within the context of this NOI, as it is a problem which is

generically associated with all geothermal development in the Geysers region. Accordingly, Staff recommends that the Committee should request the full Commission to institute a generic proceeding to identify these cumulative impacts and to specify appropriate mitigation measures, compensation plans, or regional monitoring programs which are needed to reduce these cumulative impacts to an acceptable level.

Conclusions

- 1. The Applicant shall undertake the mitigation measures specified in Findings Nos. 12, 14, 18 and 22.*
- 2. The Applicant shall provide the information specified in Findings Nos. 14, 16, 18 and 23.*
- 3. With the implementation of the measures referred to in Conclusion No. 1, and subject to further evaluation during the AFC, the Bottle Rock power plant and related facilities is acceptable from the standpoint of biological resources.*
- 4. No adjudication of these issues is necessary during the NOI.*

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3. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

It is the Committee's understanding that the McCulloch full field Environmental Impact Report will be available in approximately six months and will deal, in part, with the areas of biological concern identified in Finding Number 14 (1/9/79 Transcript, pp. 83-86, 133-35). Much of this information may be suitable for incorporation for the purposes of resolving present concerns. As a further point of clarification, the "field and laboratory studies" referred to in Finding Number 22 have not yet been received and reviewed by the Staff; a report is being finalized, however, and the results will be evaluated before a final determination on the acceptability of the proposed project is made (1/9/79 Transcript, pp. 89-92).

At the January 9, 1979 Prehearing Conference, a representative of the State Department of Fish and Game voiced his agency's concerns regarding the suitability of the site proposed by the Applicant. In addition, the DFG representative proposed an alternative location which, in his agency's view, was more acceptable (1/9/79 Transcript, pp. 94-8). The DFG representative stated that while the interagency cooperation concerning mitigation measures referred to Finding Number 16 was a "very progressive measure" (1/9/79 Transcript, p. 98), the avoidance of habitat loss was preferable to mitigation of such loss.

In a NOTICE and ORDER dated January 12, 1979, the Committee ordered the Staff and Applicant to respond, at the evidentiary hearing, to the concerns expressed by DFG at the Prehearing Conference, and to address the possibility of coordinating the planning and development of the proposed project with future projects. The Committee further ordered the Staff to submit a definition of the term "areas of critical concern" as used in Finding Number 14 above,

and to submit a detailed listing, including its position as to compliance or non-compliance, of the laws, standards, rules, and regulations governing the biological resources area. Such listing was also to include an analysis of, and response to, the laws and standards suggested as applicable by DFG in written comment (January 12, 1979 NOTICE and ORDER, items 6 & 7; see also Appendices C, D, and E). The Committee, at the time it issued this NOTICE and ORDER, anticipated that DFG's concerns would necessitate resolution in the context of the January 25 evidentiary hearing

The Staff's response to DFG's concerns basically indicated that while there were unavoidable habitat losses and disruptions associated with the proposed locations, specified measures would adequately mitigate such disturbances (see Appendix E). Moreover, the location proposed by DFG would lead to other problems concerning such areas as geotechnical, noise, and cultural resources (see 1/25/79 Transcript, pp. 300-02).

The Applicant and DFG had also reached an interdepartmental agreement concerning the latter's concerns by the time of the evidentiary hearing. In addition to the proposed project, the Applicant has agreed to consult with DFG regarding future projects (see Appendix E). Consequently, at the evidentiary hearing the DFG representative formally stated that his agency "finds the site selected by DWR to be acceptable" (1/25/79 Transcript, p. 303).

Furthermore, in its response of February 5, 1979, the Staff stated that there is a "reasonable likelihood" that the proposed project will comply with the standards identified in Finding Number 1 (Appendix E). Other standards cited in comments from DFG (Appendix C) are not substantively applicable to the proposed project (see also Appendix D).

Finally, in its February 15, 1979 response to the Committee ORDER, the Staff submitted the following definition and explanations concerning the phrase "areas of critical concern":

The following staff definition of "areas of critical concern" is stated in the definitions of the proposed Geothermal Regulations.

"Areas of critical concern" are special or unique habitats or biological communities that need protection from potential adverse effects resulting from project development and which may be identified by local, state, and federal agencies with resource responsibility within the project area, or by educational institutions, museums, biological societies, and special interest groups with specific knowledge of resources within the project area. This category includes, but is not limited to, wildlife refuges, wetlands, and areas recognized by the California Natural Area Coordinating Council and the Governor's Office of Planning and Research."

Within the regulations section regarding the contents of the Biological Resources section of the NOI is the statement:

"Comments: In the notice an attempt shall be made to identify species of special concern and areas of critical concern that may be, or are known by the applicant to be of special interest to: (1) local, state, and federal agencies responsible for biological resources within the area potentially biologically impacted by the project; and/or (2) educational institutions, museums, biological societies and members of the public that might have specific knowledge of the biological resources within the area."

As indicated in Biological Resources Finding 14 several areas onsite have been identified as "areas of critical concern". These areas, the criteria for inclusion, and studies or other considerations which form the basis for this classification are listed below.

Riparian

The importance of protecting remaining riparian habitat is stated in the California Fish and Wildlife Plan (CDFG, 1966) and Environmental Goals and Policy (OPR, 1973). The value of the onsite riparian habitat to fish and wildlife resources is identified in the wildlife and vegetation sections of the NOI and in the comments provided by California Department of Fish and Game (letter, 11/20/78).

Creeks

Wildlife habitats which provide areas of seasonal concentrations of wildlife species are areas of critical concern (OPR, 1966). Alteration of a stream in which there is at any time an existing fish resource requires the proposed construction to be modified to allow for the protection of fish resources (CDFG Code 1601-1603). The headwaters of High Valley Creek occur in the leasehold and trout probably spawn in the upper creek and they are present until mid-summer. Down stream High Valley Creek supports a standing crop of fish. The creeks potentially affected by the project and their fishery resources are identified in the NOI and by CDFG (letter, 11/20/78).

Seeps, Springs, Waterholes, Ponds, Meadows

Wildlife habitats which provide areas of seasonal concentrations of wildlife species are areas of critical concern (OPR, 1966). Potential environmental resources of statewide interest are habitats throughout California which are of "great importance to wildlife" as identified by the State Department of Fish and Game (OPR, 1966). As identified in the NOI and CDFG (letter, 11/20/78), the onsite seeps, springs, waterholes, ponds and wet meadows are of vital importance to wildlife survival during the dry season.

Grassland Community

The grassland community onsite has important components of coastal prairie which may be of statewide significance because they support relic stands of native bunch grasses. The NOI identifies the importance of the onsite grassland and the CDFG letter (11/20/78) recognizes critical habitats include unique associations of mixed plant species.

The Committee is thus persuaded that the proposed Findings and Conclusions as set forth above adequately deal with the biological resources concerns. The Committee is also cognizant that the Staff, Applicant, DFG, and the U.S. Fish and Wildlife Service (see Appendix C), among others, have all expressed the need for generic hearings dealing with overall long-range biological concerns in the Geysers area. This matter is stated in Finding Number 24. The Committee agrees with the need for these generic proceedings, and will seek to have them implemented as soon as is feasible.

PROPOSED FINDINGS AND CONCLUSIONS
CIVIL ENGINEERING/SOLID WASTE MANAGEMENT

Findings

1. The proposed Bottle Rock power plant will occupy approximately four acres of multi-level graded surface and about two acres of cut and fill slopes.
2. Site development will require moving approximately 100,000 cubic yards of excavated material and placing it in engineered fill. Cut slopes will be 1.5:1 or less and fill slopes will be 2:1 or more.
3. A small spoil area may be required, but the quantity and location have not been determined. Applicant has agreed to provide specific design criteria for this spoil area if it is required, at or prior to the filing of the AFC.
4. The final design criteria for the earth slopes associated with the proposed cuts and fills will consider appropriate seismic forces.
5. The turbine-generator building, switchyard, and cooling tower will be founded on competent bedrock while the H₂S abatement equipment and sulfur storage will be founded on the engineered fill.
6. The major solid waste produced by the power plant will be elemental sulfur from the Stretford H₂S abatement system. Transportation and disposal of the sulfur will be in accordance with the appropriate sections of the California Water Code and the California Administrative Code.
7. Other solid wastes produced from the operation of the plant are the sludge from the cooling tower and, possibly, salts from the Stretford purge stream.
8. All of these wastes are classified as Group 1 wastes, and will be disposed of in Class I or Class II-1 disposal sites.

9. Solid wastes produced during construction will be removed by the various contractors as their property to be disposed of off-site in accordance with State and local government regulations.

Conclusions

1. Applicant shall provide the information specified in Finding No. 3, if necessary.
2. Subject to evaluation of final design criteria during the AFC, the unit is acceptable from a civil engineering standpoint.
3. If the Applicant and its contractors undertake the measures referred to in Findings Nos. 6, 8 and 9, the unit is acceptable from the standpoint of solid waste management for the purposes of both the NOI and the AFC.
4. No adjudication of these issues is necessary during the NOI.

4. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

PROPOSED FINDINGS AND CONCLUSIONS
CULTURAL RESOURCES

Findings

1. Cultural resources include paleontological, archeological, historical, ethnographical resources and resources of educational, scientific, religious and other significance.
2. The applicable laws are:
 - a. National Historic Preservation Act of 1966, 16 U.S.C. 470 et seq., and implementing regulations, 36 CFR 800 et seq.
 - b. Native American Historical, Cultural and Sacred Sites, Public Resources Code section 5097.9 et seq.
3. The Applicant, through its consultant, has performed cultural resource studies on the Francisco leasehold for the Bottle Rock project.
4. The Applicant's investigations revealed the following resources to exist within the study area:
 - a. Paleontological resources: There are potentially significant localities of "Significance B", where identifiable radiolaria are present in the cherts, in the project area.
 - b. Archeological resources: There are five prehistoric archeological sites in the project area. Three of these sites meet the criteria for inclusion in the National Register of Historic Places.
 - c. Historic sites: There is a historic site in the project area. This site appears to lack historic significance, but the property does retain archeological integrity.
5. Adverse impacts to all of the resources noted in Finding No. 4 above should be avoided during project construction and operation.
6. Due to the nature and location of the archeological resources at sites CA-LAK-609 and CA-LAK-610, the Applicant has agreed to undertake an additional

study to determine the significance of these resources. The Applicant shall provide a report to the Commission detailing the results of this study by February 28, 1979.

7. The Applicant has also agreed to take interim mitigation measures, a description of which it will supply to the Commission to assure that any further damage to the identified resources at sites 605, 609 and 610 will be prevented prior to the start of construction on the project. These interim mitigation measures, and a commitment from the Applicant to abide by them, shall be submitted to the Commission no later than January 15, 1979. The Applicant agrees that there will be no project-related impacts to site 605.

8. If the identified archeological resources at sites 609 and 610 are found to be significant (e.g., if burials are found at any of these sites) as a result of the Applicant's further studies, the Applicant has agreed to submit a detailed mitigation plan for any such significant site to the Commission as expeditiously as possible.

Conclusions

1. The Applicant shall take action as specified in Findings No. 5, 6, 7 and 8.
2. The significance of the archeological resources at sites 609 and 610 will be determined after the Staff has reviewed the study specified in Finding No. 6.
3. Subject to review of the additional materials which the Applicant shall submit, the proposed project is acceptable from the standpoint of cultural resources for the purposes of both the NOI and the AFC.
4. No adjudication of this issue is necessary during the NOI.

5. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

A discussion ensued at the Prehearing Conference regarding the cultural resources sites referred to in Finding Number 7. Apparently, site CA-LAK 605 is not on the Francisco leasehold, and is not near the proposed plant site or any proposed or existing well pad; rather, it is near a road leading to private property. As such, neither the Applicant nor the steam supplier would expect construction or operation of the proposed project to impact site 605. There is, however, a relatively remote potential for project-related impacts to site 605. The language of Finding 7 is designed to assure that any possibility for project-related impacts will be avoided (1/9/79 Transcript, pp. 77-83, 127-33).

PROPOSED FINDINGS AND CONCLUSIONS
HYDROLOGY

Findings

1. Location of the proposed site approximately 40 feet above an unnamed, small, intermittent stream which is a tributary to High Valley Creek, is such that the site will be safe from flood hazards associated with stream flooding.
2. The proposed facility will be designed to assure protection against a one hundred year storm frequency, and it will be adequately protected from flood hazard associated with overland flow.
3. If the proposed facility is designed with an on-site (storage basin under cooling tower and lowest pad level) storage capacity of about 228,000 gallons (as is currently proposed by Applicant), the facility will be adequately protected from hazards associated with maximum spill potential.

Conclusions

1. The proposed facility is adequately protected from stream and overland flooding, and no further review of this issue is necessary during the NOI or AFC.
2. Subject to further evaluation of final project design during the AFC, the proposed facility appears to be adequately protected from spill-related flooding events.

6. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

PROPOSED FINDINGS AND CONCLUSIONS
NOISE

Findings

1. Lake County has an adopted noise element to its General Plan. The intent of the element is to limit noise levels at residential receptors to 55 dBA L_{dN} . Certain construction activities, such as movement of heavy equipment during daylight hours, are exempt from Lake County noise standards.
2. The State noise limits are established by CAL-OSHA, 8 Cal. Admin. Code Sections 5095-5099 and California Vehicle Code Section 23120.
3. The federal standards are set by the Occupational Safety and Health Act of 1970.
4. The ambient noise levels at the site and sensitive receptors are presented in the NOI on Tables 1 through 5 of the Noise Section.
5. The three closest identified sensitive receptors are located approximately 1/2 mile to the northeast of the proposed DWR plant site. Based upon the estimated facility operational noise level of 60dBA at 500 feet, the projected noise level to these receptors would not exceed any of the applicable standards. The projected operating noise level would also not exceed the standards to other identified sensitive receptors which are farther distant than 1/2 mile.
6. The typical frequency spectrum data for geothermal units at the Geysers is shown in the Noise Section of the NOI, pages 18-24. Certain tonalities from the steam jet ejector, cooling tower, and turbine generator are expected to be discernible at the plant, but through the implementation of mitigation measures, molecular absorption and the barrier effect of the turbine generator building, it is expected that these tonalities would on rare occasions be barely audible out-

of-doors at the sensitive residential receptors. This should not be considered an adverse noise impact.

7. The following mitigation measures will be implemented by the Applicant:

- a) Path treatment will be installed on the exterior surfaces of the steam jet ejectors and will consist of mineral wool and an impervious membrane (aluminum and/or lead jacket).
- b) Installation of combined thermal (high density) and sound insulation on the exterior surfaces of the steam turbine, reducing the noise inside the turbine building.
- c) Concrete walls and wooden roof of the turbine building to provide an effective barrier to reduce noise propagated to the outside environment.
- d) Sound-proof office space will be installed within the turbine/generator building.
- e) Steam drain lines will be routed back to the condenser so that steam will not be vented to the atmosphere during plant start-up.
- f) During outage conditions, steam will be vented through a rock muffler system installed and operated by the steam supplier, thus mitigating the most serious noise impact potential of the project.
- g) Encouraging equipment suppliers to supply mechanical equipment that produces a sound level no greater than 80 dBA at three to five feet from the boundaries of the device.

8. The highest plant construction noises will be caused by large earth moving equipment. Noise associated with this equipment will be discernible to some of the receptors. However, the activity will be temporary in nature and performed during daylight hours whenever possible.

9. DWR will require its employees to comply with the requirements of CAL-OSHA for hearing conservation through administrative controls and/or the use of

hearing protectors whenever necessary.

10. Representative lists of typical noise sources and levels associated with steam supply activities are set forth in the Environmental Impact Report for Union Oil, Unit 17 (December 1977) and Union Oil Simplified Noise Model, Unit 17 Geothermal Development Area (March 1978).

11. The projected noise levels for production well testing with portable test mufflers, steam transmission lines start-up via unmuffled well head venting and well head master valve changes will be significant noise sources and will be discernible to sensitive receptors. However, these three events occur infrequently. The noise, other than the above three associated with the steam field development and production, will not be discernible to sensitive receptors.

12. The effects from the steam field development generally exceed plant construction and operation noise levels. The cumulative impacts of these two noise sources will not increase the impact on the receptors over the noise levels associated with the well development operation noise levels.

13. The Applicant has agreed to provide detailed data which demonstrate that the Bottle Rock power plant will produce a noise level no greater than 60 dBA at 500 feet, prior to or at the time of the AFC filing.

Conclusions

1. The Applicant shall undertake the noise impacts mitigation measures specified in Findings Nos. 7, 8, and 9.

2. With the implementation of the measures specified in Finding Number 7, the power plant noises during normal operations should be virtually inaudible to the closest receptor to the power plant site.

3. *With the implementation of the measures specified in Finding Number 7, power plant noise during normal operations will be in compliance with Lake County noise standards and with the requirements of CAL-OSHA and with federal standards.*
4. *With the implementation of the measures specified in Finding Number 7, noise during periods of steam stacking will be inaudible to the closest receptors to the power plant site.*
5. *With the implementation of the measures specified in Finding Number 7, noise during periods of steam stacking will be in compliance with Lake County noise standards and with the requirements of CAL-OSHA and with federal standards.*
6. *Noise caused by steam field operations will be generally discernible to the local receptors, but such noises are within the tolerable range.*
7. *Noises caused by construction of the power plant and related facilities will be discernible to some of the receptors closest to the power plant site but will be in compliance with Lake County noise standards and CAL-OSHA requirements and federal standards.*
8. *The Applicant shall limit the use of heavy earth moving equipment to daylight hours whenever possible. If the Applicant limits the use of earth moving equipment to daylight hours, the noise caused by plant construction will be tolerable to local receptors.*
9. *The Applicant shall provide the data specified in Finding Number 13.*
10. *Subject to further evaluation during the AFC, the proposed project is acceptable from the standpoint of noise impacts.*
11. *No adjudication of this issue is necessary during the NOI.*

7. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

PROPOSED FINDINGS AND CONCLUSIONS
SOCIO-ECONOMIC IMPACTS

Findings

1. At the peak construction period of the proposed power plant (1982-3), approximately 109 workers will be employed. This figure includes the crews which will be working for the leaseholder (McCulloch Geothermal) during steamfield development.
2. The previous operations in the Geysers area have established a resident labor force in the Sonoma-Lake County Area.
3. Both Lake and Sonoma Counties will have economic benefits from the construction and operation of the Bottle Rock power plant, irrespective of the origin of the workers. These benefits reflect the additional economic activity generated in the two Counties as a result of the payrolls of the personnel involved in the project.
4. Lake County will derive tax revenues from the development of the Bottle Rock steam field.
5. The Bottle Rock power plant itself will be state-owned and therefore will not be subject to property taxation, although the power plant site itself will be taxable.
6. The passage of Proposition 13 and the legislation enacted for its implementation will affect the property tax revenues to be derived from construction and operation of the Bottle Rock plant and associated steamfield.
7. It is anticipated that the costs borne by local jurisdictions (in particular, Lake County) as a result of the construction and operation of the Bottle Rock

project will be minimal and that tax revenues derived from the project should be sufficient to offset such costs.

8. However, the matter set forth in Finding NO. 7 above cannot be confirmed until the Applicant provides further information on the estimated costs to local jurisdictions of additional public services to be provided in connection with the construction and operation of the proposed project, and on the estimated tax revenues which the project will generate. Accordingly, the Applicant has agreed to provide this information on estimated costs of public services and estimated tax revenues, to the extent it is available or can be made available, by February 1, 1979.

9. It is anticipated that adequate housing will be available in Lake County to accomodate those workers who move into the vicinity of the project site during project construction.

10. However, the matter set forth in Finding No. 9 cannot be confirmed until the Applicant provides additional information on the availability of housing in the vicinity of the plant site. Accordingly, the Applicant has agreed to provide this information, to the extent it is available or can be made available, by March 1, 1979.

11. The proposed power plant is located in an area whose principal land use is the exploration, development, and utilization of geothermal energy and which has numerous geothermal power plants in operation. Accordingly, the project does not appear to be incompatible with existing and proposed land uses.

12. Lake County has been requested to provide comments and recommendations regarding the compatability of the proposed project with local land use plans, goals, and policies. No response has been received to date.

Conclusions

1. Due to the present resident labor force in the Sonoma-Lake Counties area, the Bottle Rock project will not cause a significant increase in the number of construction workers who may migrate to these areas in order to work on the project.
2. The tax revenues derived from the Bottle Rock project are likely to be sufficient to offset the project-related costs borne by local jurisdictions.
3. Adequate housing is likely to be available in Lake County to accommodate those workers who move into the vicinity of the project site during project construction.
4. The proposed project appears to be compatible with the land use plans of Lake County.
5. The Applicant shall provide the information specified in Findings Nos. 8 and 10.
6. Subject to review of the information which is to be provided, the Bottle Rock project is acceptable from the standpoint of socio-economic impacts for the purposes of both the NOI and the AFC.
7. No adjudication of this issue is necessary during the NOI.

8. Committee Findings and Conclusions

The Committee adopts, as preliminary, the Findings and Conclusions set forth above.

In response to a concern raised by the State Department of Transportation (see Appendix C), the Applicant stated that Highway 175 will serve as a partial principal access route (1/9/79 Transcript, p. 68).

The "existing and proposed land uses" referred to in Findings 12 and 13 do not include air quality considerations (1/9/79 Transcript, pp. 71-2). The Committee has requested local agencies to respond regarding compatibility of the proposed project with local land use plans, goals and policies. No response has been received to date. The Committee will, however, issue another request.

Next, the Committee understands that the impacts of the "proposed project" include the impacts of both the plant site and the 1.2 mile tap line (1/9/79 Transcript, pp. 72-6). The ultimate impacts depend of course on the methods of transmitting power out of the Geysers; this issue, while relevant, is currently under consideration in another Commission proceeding.

Finally, as stated in Finding Number 5, the power plant site itself would not be subject to property taxation. The State Board of Equalization estimates that approximately \$180,000 would be generated annually by the taxable portion of the proposed project, i.e., the portion owned by the steam producer (see Appendix C).

PROPOSED FINDINGS AND CONCLUSIONS
SOILS

Findings

1. *The soils series surrounding the plant site will be highly erosive when disturbed by earth moving activities.*

2. *The requirements and regulations applicable to the proposed Bottle Rock plant regarding soils are:*

The requirements contained in the Waste Discharge Requirements for Non-Sewerable Waste Disposal to Land-Disposal Site Design and Operation Information (January 1978) by the California State Water Resources Control Board.

3. *The mitigation measures to be utilized for the proposed Bottle Rock plant to control soil loss and erosion are as follows:*

- a. Sprinkling operation during construction;*
- b. Small debris dams creating settling basins will be constructed and maintained in the runoff channels which drain the plant site area;*
- c. Cut slopes will be 1.5:1 or less;*
- d. Fill slopes will be 2:1 or more;*
- e. Slopes will be revegetated with native grasses, trees, and shrubs;*
- f. State-of-the-Art techniques such as jute, straw, punching, and hydro-mulching for revegetation will be utilized;*
- g. No earth-moving activities during rainy or high-wind periods;*
- h. With the exception of Sections II C7 and C8, the Applicant will adhere to the requirements set forth in Sections IIB and IIC of the Lake County Planning Commission Resolution No. 75-154.*

4. *The mitigation measures proposed by the Applicant appear to be acceptable. No specific schedule or design for implementation has been designated. The Applicant has agreed to provide the specific designs and schedules for the*

implementation of the measures outlined in Finding 3 above prior to or at the time of the AFC filing.

Conclusions

1. The Applicant shall implement the mitigation measures outlined in Finding No. 3.
2. If the Applicant implements the mitigation measures specified in Finding No. 3, and subject to further evaluation during the AFC, the proposed project is acceptable from the standpoint of impacts to soils.
3. The Applicant shall provide the information specified in Finding No. 4.
4. No adjudication of this issue is necessary during the NOI.

9. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions. While the Staff's position is that construction at the proposed site could result in soil being easily eroded by wind and rain action, the Staff nevertheless feels that the Applicant has proposed adequate mitigation measures (1/25/79 Transcript, p. 290).

PROPOSED FINDINGS AND CONCLUSIONS
WATER QUALITY

Findings

1. The Stretford effluent and steam condensate are likely to contain substances which are classified as toxic and hazardous.
2. The Stretford effluent will be divided into elemental sulphur and Stretford purge stream. The latter will be reclaimed or disposed of by reinjection or in a Class I or II-1 dump site. The elemental sulphur will either be stored in a tank keeping it in a molten state for later disposal or will be allowed to solidify on site. Onsite storage will comply with Waste Discharge Requirements from the Regional Water Quality Control Board.
3. The steam condensate will be used for cooling water and the excess will be reinjected.
4. The cooling tower emissions are likely to contain certain toxic substances. It is unlikely that these emissions would be deposited or otherwise reach surface waters in quantities sufficient to cause a violation of water quality standards.
5. The water quality standards which will be met include:
 - a. Porter-Cologne Water Quality Act
 - b. California Regional Water Quality Control Plan Sacramento River Basin (5a)
 - c. Federal Clean Water Act (Section 33 USC 1321)
 - d. "Waste Discharge Requirements for Nonsewerable Waste Disposal to Land" January, 1978, California State Water Resources Control Board.
6. The Applicant has proposed to construct a retention barrier to surround the entire plant to contain any spills, with the following characteristics:
 - a. The barrier will be impermeable and have a volume greater than any anticipated spill. The area of the retention barrier shall be lined with a material of a permeability of 1×10^{-6} cm sec or less. Prior to

or at the time of the AFC filing, the Applicant shall submit detailed design criteria for the retention barrier and liner.

- b. A catch basin with pump facilities and alarm devices will be constructed to pump any condensate spills back to the reinjection sump.
- c. The monitoring and operating system for containing and controlling spills has not been designed as yet. Prior to or at the time of the AFC filing, the Applicant will supply a detailed description of the following: 1) facilities; 2) equipment; 3) monitoring; 4) operating and; 5) reporting procedures necessary to assure that the spill retention systems will comply with all applicable regulations and standards.

7. The Applicant will assure that a monitoring program will be established to evaluate long term impacts of plant construction and operation on High Valley Creek and Kelsey Creek. Prior to or at the time of the AFC filing, the Applicant shall provide a detailed monitoring plan.

8. The Applicant intends to dispose of sewage by a leach field or by injection into the steam field. Prior to or at the time of the AFC filing, the Applicant will provide specific details of its proposed sewage disposal facilities and their operational capabilities.

Conclusions

- 1. There will be no intentional discharge of any toxic or hazardous material into surface waters in quantities sufficient to affect water quality.
- 2. It is unlikely that plume drift deposition will violate water quality standards.
- 3. The Applicant shall provide the information specified in Findings Nos. 6, 7, and 8 above.
- 4. If the Applicant follows the proposals outlined in Findings Nos. 2, 3, and 6, the project is unlikely to exceed water quality standards.

5. *Subject to further evaluation of the information to be provided, the proposed project is acceptable from the standpoint of water quality.*

6. *No adjudication of this issue is necessary in the NOI.*

10. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

The State Solid Waste Management Board (SWMB) has raised concerns dealing with the quantity of the wastes that would be disposed of and the effects upon state disposal sites (Appendix C). The Committee understands the Staff has informed the SWMB that these concerns would be more appropriately dealt with in the context of the EIR (1/9/79 Transcript, pp. 121-2), and that the SWMB agrees that its concerns would not affect the NOI. However, since the SWMB's concerns do bear on impact mitigation and final design, they will more appropriately be dealt with in the context of the EIR and AFC proceedings, should the Commission approve the NOI.

PROPOSED FINDINGS AND CONCLUSIONS
WATER RESOURCES

Findings

1. The Applicant proposes to utilize condensed geothermal steam for the plant cooling water supply.
2. The total plant needs for fresh water will be minimal and should total approximately four acre feet annually.
3. The sources of necessary fresh water will be from either trucking water from existing sources, drilling a water well on the leasehold, utilizing the turbine building roof or paved areas for capturing rain water, or treating excess condensate. Additionally, bottled water will be provided for human consumption. In any event, the impacts on water resources would be minimal.
4. Water needs during the construction period will be approximately ten acre feet.

Conclusions

1. The construction and operation of the proposed plant would not adversely affect fresh water resources.
2. No adjudication of this issue is necessary during the NOI or AFC.

11. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

IV. PUBLIC HEALTH, SAFETY, AND RELIABILITY

A. Introduction

Public Resources Code Sections 25511 and 25512 require the Commission to determine the adequacy of measures proposed by the Applicant to protect public health and safety. Central to this consideration is determining the conformity of the proposed power plant with applicable public health and safety laws and standards.

Public Resources Code Section 25216.3 authorizes the Commission to "compile relevant local, regional, state, and federal land use, public safety, environmental, and other standards to be met in designing, siting, and operating facilities in the state", and to "...adopt standards, except for air and water quality, to be met in designing or operating facilities to safeguard public health and safety, which may be different from or more stringent than those adopted by local, regional, or other state agencies...".

The Commission has not adopted standards different from or more stringent than any local, regional, state, or federal standards effective at the present time. Thus, the Commission is currently using existing standards as the benchmark to evaluate the adequacy of public health and safety protection measures.

Many of the site-related issues discussed in previous sections of this Report are relevant to making the public health, safety, and reliability determinations required by Public Resources Code Section 25511. For example, certain of the Findings and Conclusions on Air Quality, Findings 6-9 on Civil Engineering/Solid Waste Management, Findings 1-3 and Conclusion 1 on Hydrology, Findings 2-12 and Conclusions 1-8 on Noise, and Findings 1-8 and Conclusions 1-4

on Water Quality, among others, speak to the adequacy of public health and safety protection measures. In addition, there are three other issues logically related to making safety and reliability determinations for geothermal power plants. These are the Geotechnology, Structural Engineering, and Systems Engineering issues discussed in Section IV.C. Finally, Section IV.C.4 includes Findings and Conclusions jointly proposed by the Applicant and the Staff specifically dealing with the area of Safety and Reliability, as required by Public Resources Code Sections 25511 and 25512.

B. Public Health

1. Introduction

Geothermal steam found at the Geysers is composed of various chemical elements and compounds. In a geothermal power plant, this steam source is used to provide heat (and energy) to drive electric power-producing turbines and generators. The steam is not, however, totally "consumed" during the generation process. Rather, a portion is condensed and reinjected into the underlying steam field and a portion is ducted into the cooling tower for release into the atmosphere. This cooling tower exhaust and other ventings into the atmosphere (such as during periods of steam stacking) expose the surrounding area to the chemical components of the geothermal steam.

Hydrogen sulfide (H_2S) is the principal chemical component of the exhaust gas that is of public health concern, although constituents such as ammonia, arsenic, mercury, sulfur dioxide, suspended particulates, and radio-nuclides are also present. It has been apparent through the course of these proceedings that potential adverse health effects of H_2S could become an area of dispute.

2. Area of Dispute

At the informational hearing in Lakeport, a member of the public expressed concern that H₂S emissions were detrimental to her health (Appendix B). The Staff and the Applicant initially submitted joint Proposed Findings and Conclusions (Hydrogen Sulfide) in their Joint Statement which included the following Proposed Finding 2:

"Chronic long-term exposure to H₂S concentrations of 0.08 ppm and above has been reported to cause adverse health effects in the human population."

Proposed Conclusion 1 (Hydrogen Sulfide), as contained in the Joint Statement, read:

"There is disagreement among experts as to the health effects of chronic low-level exposure to H₂S."

Though the Staff and Applicant had initially agreed to the language contained in the jointly proposed "Public Health" Findings and Conclusions, these parties discovered at the Prehearing Conference that they were in disagreement concerning interpretation of the Finding and the Conclusion on Hydrogen Sulfide set forth above. The Staff and DWR, however, agreed to all other Findings and Conclusions on Public Health, with minor amendments.

Accordingly, in its January 12 Hearing Order, the Committee notified the parties that the issue of "Public Health - health effects of long-term exposure to low-level concentrations of H₂S" would be adjudicated at the January 25 evidentiary hearing. The Committee also scheduled appearance of witnesses in conformity with the parties' indications at the Prehearing Conference, and notified the parties that testimony and other offers of proof would be subject to the opportunity for cross-examination, challenge, and rebuttal.

At the evidentiary hearing, the parties made offers of proof consisting of written testimony supporting the jointly proposed "Public Health" Findings and Conclusions to the extent they agreed, i.e. except for Finding 2 and Conclusion 1 on Hydrogen Sulfide as contained in the Joint Statement* (January 25, 1979 Transcript, pp. 304-09). The Applicant and the Staff then proceeded to offer written and oral testimony and supporting documents on their respective positions concerning the Public Health issue in dispute. A summary of the Applicant's and the Staff's positions is contained in the next two subsections.

Following conclusion of the evidentiary hearing, the Applicant submitted a post-hearing Brief and Proposed Findings and Conclusions on the "Public Health Effects of Long-Term Exposure to Low Concentrations of Hydrogen Sulfide" (February 2, 1979). The Staff submitted its Brief and proposed Findings and Conclusions concerning this issue on February 15, 1979. Applicant then submitted a Reply Brief on February 28, 1979. Salient points raised in these Briefs are also discussed in the next two subsections.

a. Applicant Position

The Applicant's position is basically that Staff has proffered evidence which is insufficient to support the proposed Finding and Conclusion at issue because of the questionable validity of cited reports, and that the proposed Finding and Conclusion are misleading in implying that valid reports exist which would lead experts in the field to divergent, well-founded conclusions concerning the health effects of long-term exposure to low-level

*The Staff also stated specifically that its written testimony would not support jointly proposed Finding 3; DWR's written testimony was offered in support of that Finding (January 25, 1979 Transcript, pp. 306-07).

concentrations of H₂S (see generally, Applicant's Brief of February 2, 1979 and Reply Brief of February 28, 1979).

The testimony of Applicant's witnesses at the evidentiary hearing was structured principally to challenge the validity of documents* relied upon by Staff and, as appropriate, the methodology used (January 25, 1979 Transcript, pp. 329-78). In referring to the proposed Finding and Conclusion in question, one of the Applicant's witnesses stated, in part:

"***I think that the [proposed Finding and Conclusion], based upon the studies that I have read and my analysis of the information, that it is an overly simplistic conclusion, and it to me conveys the impression that hydrogen sulfide alone may be responsible for health effects at these low levels [0.08 ppm], whereas that is not consistent with the information that is available." (January 25, 1979 Transcript, p. 341, L16-22.)

The Applicant urges the Committee to:

"...look beyond the words of the Finding to the studies which purportedly 'report' the adverse health effects from exposure to H₂S concentrations of 0.08 ppm and to conclude ...that Staff's proposed Finding should not be accepted because of the questionably [sic] validity of the study upon which the report is based and because of the misleading nature of the Finding. (Applicant's Reply Brief, February 28, 1979, p. 2, L19-25.)

More specifically, Applicant challenges the validity of the referenced study, the "Schieler Report" as being invalid, containing serious problems with the methodology used, and having been performed under conditions where H₂S was mixed with toxic co-contaminants, notably sulfur dioxide (Id., p. 3, L 1-6). Applicant's position is similar concerning the Terre Haute study, especially in regard to the level of H₂S concentrations involved which, Applicant states, were significantly above the level of 0.08 ppm.

*Specifically, the "Schieler Report", the Illinois Institute for Environmental Quality Study, the "Terre Haute" Study, and various Russian studies.

b. Staff Position

Staff's basic position is that proposed Finding 2 and Conclusion 1 on Hydrogen Sulfide are acceptable because chronic long-term exposure to low levels of H₂S have been reported to cause adverse human health effects and that there is disagreement among experts as to the health effects of such exposure. Moreover, Staff proposes additional language to Finding 3* as contained in the Joint Statement. That Finding would read:

"A number of controlled studies have indicated that the human body is capable of detoxifying low concentrations of H₂S without resulting in adverse health effects. However, none of those studies are based on observations of human health effects associated with low level inhalation exposures to H₂S." (Staff Brief, February 15, 1979, pp. 1-2.)

Staff and Applicant both support the first portion of this proposed Finding; Staff, however, would add the complete second sentence to, in their view, "place this proposed Finding in a more accurate light" (Id., p-2)

Staff's position, and the testimony of its witnesses, are intended to indicate that the proposed Finding and Conclusion on Hydrogen Sulfide are correct as contained in the Joint Statement as originally submitted, despite Applicant's challenge to the reputability and methodology of the cited documents (January 25, 1979 Transcript, pp. 380-99). In this respect, a Staff witness stated that:

"...staff has not taken the position that low levels of H₂S do cause health effects, rather that it has been reported." (January 25, 1979 Transcript, p. 382, L 3-5; see also Staff Brief, pp.5-6.)

*Staff's written testimony specifically excludes support for this Finding as contained in the Joint Statement.

Staff further contends that the underlying studies are valid, especially the Terre Haute study which has received substantial peer review, and which should not be construed as unreliable because of the measurement methodology used (Staff Brief, pp. 3-5).

Another major stance taken by Staff concerns proposed Conclusion 1, regarding disagreement by experts as to the health effects of long-term exposure to low-level concentrations of H₂S. Staff's position, in summary, is that there is such disagreement, "... whether or not one expert asserts that there is a more valid basis for his or her position than another" (Id., p. 9, emphasis in original). In fact, Staff contends:

"***To the extent that the Applicant's witness is an expert, and that those scientists responsible for questioned studies are also experts, there is a disagreement among experts, whether or not the Applicant's witness believes these studies to be well founded." (Id., pp. 7-8; emphasis in original.)

3. Preliminary Committee Findings and Conclusions

The Committee has carefully considered the testimony proffered by Staff and Applicant and the arguments propounded in their respective Briefs. After evaluating the competing positions in light of the evidence of record, the Committee concludes, regarding the Finding and Conclusion in question:

- a) The Schieler Report, Illinois Institute for Environmental Quality Study, and the Terre Haute Study are reliable to the extent that they constitute studies on the health effects of H₂S. The Committee specifically makes no Finding nor draws any Conclusion as to the validity of the methods used or conclusions drawn in these reports. It does, however, observe that the methodology used in the 1964 Terre Haute study to measure H₂S concentrations is not as sophisticated as that available today.
- b) The testimony of witnesses on behalf of both the Staff and Applicant indicates that the current level of study regarding the

health effects of long-term exposure to low-level concentrations of H₂S is insufficient to determine whether or not adverse impacts result to the human population.

- c) From the available evidence of record, it is apparent that studies thus far have considered the effects of H₂S in association with other contaminants.
- d) It is not possible to state that experts, implying universality of opinion, would all agree on the effects of long-term exposure to low-level concentrations of H₂S, given the aforementioned data inadequacies.

The Committee therefore rejects the versions of Finding 2 and Conclusion 1 on Hydrogen Sulfide, and amends the language of Finding 3. These modifications are set forth in gothic characters in the Preliminary Findings and Conclusions on Public Health, following. The Committee adopts, as preliminary, the balance of the Findings and Conclusions as contained in the Joint Statement, as amended.

PRELIMINARY FINDINGS AND CONCLUSIONS
PUBLIC HEALTH

Findings - Hydrogen Sulfide

1. The Bottle Rock project will emit hydrogen sulfide (H_2S) in the cooling tower exhaust during normal plant operation and in the steam supply during periods of steam stacking.
2. The available data, reports, and studies which have reported adverse human health effects due to chronic long-term exposure to low-level concentrations of H_2S have utilized methodology which has evaluated the impacts of H_2S in conjunction with other co-contaminants. At present, the available data is insufficient to determine whether or not low concentrations of H_2S alone result in adverse human health impacts.
3. A number of controlled studies have indicated that the human body is capable of detoxifying low concentrations of H_2S without resulting in adverse health effects. However, none of these studies are based on observations of human health effects associated with low level inhalation exposures to H_2S .
4. Hydrogen sulfide has an odor which can be detected at concentrations less than 0.08 ppm.
5. The state ambient air quality standard for H_2S is 0.03 ppm (one hour average).
6. The state ambient air quality standard for H_2S is based on a nuisance odor threshold.
7. The proposed Illinois ambient air quality standard for H_2S , which is intended to protect public health, is 0.01 ppm (8 hour average).

8. Ambient H_2S concentrations in Cobb Valley have exceeded the state standard of 0.03 ppm.

9. The impact of H_2S emissions from the Bottle Rock plant during normal power plant operation on ambient H_2S concentrations at receptors in the Geysers Area has not yet been adequately determined for all meteorological conditions identified by Staff.

10. The impact of H_2S emissions from the steam release valve during periods of steam stacking on ambient H_2S concentrations at receptors in the Geysers Area has not yet been adequately determined.

11. The Applicant shall ensure that ambient H_2S concentrations continue to be monitored in the vicinity of the Bottle Rock plant to determine the level of H_2S exposure experienced by the local population. The Applicant has agreed to submit a proposal specifying the manner in which continued monitoring is to be effected at or prior to the time of the AFC filing.

Conclusions

1. The presently existing data is insufficient to permit experts to reach a uniformly accepted position regarding the human health effects of chronic low-level exposure to H_2S .

2. There is insufficient data regarding the impact of Bottle Rock H_2S emissions on ambient H_2S concentrations, and the human response to low-level, long-term exposure to H_2S has not been completely delineated. However, there is no strong evidence to suggest that public health will be adversely impacted by operation of this plant.

3. The Applicant shall provide the information specified in Finding No. 11.

4. No adjudication of this issue is necessary during the NOI. However, further evaluation of this issue is appropriate when an air quality impact analysis becomes available.

Findings - Ammonia, Ammonium Compounds, Sulfates

1. The Bottle Rock project will emit ammonia in the cooling tower exhaust drift during normal operation and in the steam supply during periods of steam stacking.
2. Inhalation of ammonia in sufficient quantities can cause adverse health effects.
3. There is no applicable ambient air quality standard for ammonia. The California Occupational Safety and Health Standard is 25 ppm (8 hour average). A study commissioned but not necessarily endorsed by the Environmental Protection Agency has suggested 0.06 ppm as a safe level for ammonia concentrations in ambient air. (Multimedia Environmental Goals for Environmental Assessment, EPA Document 600/7-77-136 a, November, 1977).
4. Ammonia concentrations in steam from 61 producing wells at the Geysers have averaged 194 parts per million (ppm) by weight.
5. The ammonia concentrations in steam from two test wells for the Bottle Rock plant averaged 220 ppm by weight.
6. The Applicant has agreed to provide estimated ammonia emission rates and an analysis of the air quality impact of project ammonia emissions at or prior to the AFC filing.
7. Atmospheric reactions of ammonia emissions could potentially form toxic ammonium compounds, such as ammonium sulfate.
8. Sulfates can form through atmospheric oxidation of H_2S .
9. Sulfates can be toxic to humans when inhaled in sufficient quantities.
10. The California ambient air quality standard for suspended sulfates is 25 ug/m^3 (24 hour average).

11. The ambient air quality standard for sulfates is not expected to be exceeded as a result of normal power plant operation or the stacking of the steam supply for the Bottle Rock plant.

12. Ambient temperatures and concentrations of precursors at the Geysers do not permit the formation of ammonium bisulfide in quantities that could cause adverse health effects.

Conclusions

1. Applicant shall provide the data specified in Finding No. 6.
2. Further evaluation of the potential impacts of the project's emissions on ambient ammonia concentrations and ultimately on public health is appropriate when an air quality impact analysis becomes available.
3. Ammonium bisulfide formed by atmospheric reaction of ammonia emissions will not be present in sufficient quantities to cause adverse health effects.
4. Since the state ambient air quality standard for sulfates is not expected to be exceeded, adverse health impacts should not occur from sulfate formations resulting from operation of the Bottle Rock plant.
5. No adjudication of this issue is necessary during the NOI.

Findings - Arsenic

1. The Bottle Rock plant will emit some form of arsenic from the cooling tower and from the steam release valve during steam stacking into the ambient air. Arsenic detected in geothermal steam may be present as suspended particulates, arsenic trioxide vapor or possibly arsine.
2. All forms of arsenic are known to be toxic at some concentrations, and some forms are potentially carcinogenic.
3. A study published by the World Health Organization has proposed a safe ambient air quality level for arsenic of 5.9 ug/m^3 averaged over a 24 hour period. The National Institute for Occupational Safety and Health suggests a standard of 2.0 ug/m^3 per 15 minute sampling for arsenic trioxide to protect against carcinogenic effects.
4. A study commissioned but not necessarily endorsed by the Environmental Protection Agency has suggested 0.005 ug/m^3 as a safe level for arsenic concentrations in ambient air. (EPA-600/7-77-136a).
5. Arsenic released to the atmosphere during normal power plant operation and during periods of steam stacking will be substantially diluted before reaching the nearest receptor.
6. The Applicant has agreed to provide estimated arsenic emission rates and resulting ambient arsenic concentrations at or prior to the AFC filing.

Conclusions

1. The Applicant shall provide the information specified in Finding No. 6.
2. Further evaluation of the potential impacts of the project's arsenic emissions on ambient arsenic concentrations and ultimately on public health is appropriate when an air quality impact analysis becomes available.
3. No adjudication of this issue is necessary during the NOI.

Findings - Mercury

1. Elemental mercury vapor and other mercury forms will be emitted from the cooling tower during normal power plant operation and at the steam release valve during periods of steam stacking.
2. Mercury is toxic to humans when inhaled or ingested in sufficient quantities.
3. There is no adopted ambient air quality standard for mercury, although a study published by the World Health Organization has suggested a standard of 0.8 ug/m^3 for all forms of mercury. A study commissioned but not necessarily endorsed by the Environmental Protection Agency has suggested a maximum ambient level of 0.1 ug/m^3 to protect against toxicity and 0.01 ug/m^3 to protect against potential carcinogenic effects (EPA-600/7-77-136 a).
4. The mercury concentration in steam from 61 producing wells at the Geysers averaged 0.005 ppm (42 ug/m^3).
5. The mercury concentration in steam from two wells for the Bottle Rock plant averaged 0.60 ug/l ($6 \times 10^{-4} \text{ ppm}_w$).
6. Mercury is diluted in the atmosphere during transport to nearby populated areas.
7. Ambient mercury concentrations in the Geysers monitored by Battelle Northwest Laboratories ranged from less than 0.001 to 0.018 ug/m^3 . The ambient concentrations were monitored while 11 geothermal power plants were operating. At least one additional power plant may be operating in the vicinity of the proposed site at the time the Bottle Rock plant is scheduled to commence operation.

8. *The Applicant has agreed to provide estimated mercury emission rates and an analysis of resulting ambient mercury concentrations at or prior to the AFC filing.*
9. *Mercury can enter the food chain from contaminated air, soil, and water.*
10. *Mercury in the food chain can adversely impact public health if present in sufficient quantities.*
11. *The addition of mercury from Bottle Rock emissions to the food chain as a result of normal power plant operation and steam release valve during periods of steam stacking is not expected to be significant.*

Conclusions

1. *Applicant shall provide the information as specified in Finding No. 8.*
2. *Further evaluation of the potential impacts of the project's mercury emissions on ambient mercury concentrations and ultimately on public health is appropriate when an air quality impact analysis becomes available.*
3. *The addition of mercury to the food chain from the operation of the Bottle Rock plant will not adversely affect public health.*
4. *No adjudication of this issue is necessary during the NOI.*

Findings - Radionuclides

1. The noncondensable gas fraction of geothermal steam originating from natural fumaroles and developed wells contains the noble radioactive gas, radon-222 (^{222}Rn).
2. Radium-226 is a parent radionuclide of ^{222}Rn and occurs naturally in the soil in varying concentrations at The Geysers.
3. Inhalation of short-lived daughter products of ^{222}Rn can cause adverse health effects.
4. The maximum rate of release of ^{222}Rn in emissions from the 11 operating power plants at The Geysers is approximately 1.43 Ci/day.
5. The results of The Geysers Radiological Measurement Program conducted by LFE Environmental Laboratory indicate that the highest recorded ^{222}Rn concentrations in the air, with the operation of 11 power plants, were 0.5 pCi/l at Units 1-2 and 1.4 pCi/l at SRI station 7 (Sawmill Flat) in an area of elevated ^{226}Ra in the soil.
6. It is not anticipated that the ^{222}Rn content in the steam supply for the Bottle Rock plant will be substantially different than the average ^{222}Rn content in the steam supply for PG&E Units 1-11.
7. The California standards for ^{222}Rn content are 100 pCi/l in air for a controlled area and 3 pCi/l in air, above natural background, in an uncontrolled area.
8. DWR should initiate a monitoring program to verify that concentrations of radon-222 from plant operation remain below applicable standards. The Applicant has therefore agreed to provide detailed information on a proposed ^{222}Rn monitoring program, if necessary, at or prior to the filing of an AFC.

Conclusions

1. If ^{222}Rn content in the steam supply for the Bottle Rock plant is similar to that for PG&E Units 1-11, the resultant ambient concentrations from Bottle Rock will not exceed ^{222}Rn standards for both controlled and uncontrolled areas and should not cause an adverse public health impact.
2. The Applicant shall provide the information specified in Finding No. 8, if necessary.
3. No adjudication of this issue is necessary during the NOI.

Findings - Sulfur Dioxide

1. Atmospheric oxidation of H_2S may form small amounts of sulfur dioxide (SO_2).
2. The California Air Resources Board has established a 1 hour ambient air quality standard of 0.5 ppm SO_2 ; and a 24 hour standard of 0.05 ppm SO_2 in the presence of oxidant or particulate standard exceedance.
3. The California ambient air quality standard for SO_2 will not be exceeded as a result of operation of the Bottle Rock plant during normal power plant operation or during periods of steam stacking.

Conclusion

1. Ambient air concentrations of SO_2 resulting from operation of the Bottle Rock plant will not adversely affect public health.

Findings - TSP

1. Total suspended particulates can, depending on their particle size and chemical composition, produce adverse health effects.
2. The California Air Resources Board has adopted an annual standard for TSP of 60 ug/m^3 and a 24 hour standard of 100 ug/m^3 .
3. The ambient air quality standard for TSP is intended to protect the public from adverse health impacts.
4. Emissions from normal operation of the Bottle Rock plant will not prevent the attainment, interfere with the maintenance, or cause a violation of the ambient air quality standard for total suspended particulates (TSP).
5. The Applicant has provided insufficient information to determine that emissions from the steam release valve will not prevent the attainment, interfere with the maintenance, or cause a violation of the ambient air quality standard for TSP during periods of steam stacking. The Applicant has therefore agreed to provide additional information regarding the rate of TSP emissions during periods of steam stacking at or prior to the time of the AFC filing.

Conclusions

1. Emissions of TSP during normal power plant operation will not result in adverse public health impacts.
2. The Applicant shall provide the information specified in Finding No. 5.
3. Further evaluation of the potential public health impacts of project TSP emissions during periods of steam stacking is appropriate when additional air quality data becomes available.
4. No adjudication of this issue is necessary during the NOI.

C. Safety and Reliability

1. Introduction

To further carry out the mandates of Public Resources Code section 25511 which require the Commission to determine the adequacy of measures proposed by the Applicant to protect public health and safety, section 25512 requires the Committee to include Findings and Conclusions in the Preliminary Report regarding factors related to the "safety and reliability" of the facilities at the site. Special design features to protect against seismic and other potential hazards can logically be included among these factors, which are covered in part in the following Proposed Findings and Conclusions on "Structural Engineering" and "Systems Engineering". The Committee has also included Proposed Findings and Conclusions dealing specifically with the area of "Reliability and Safety".

The Staff and the Applicant proposed Joint Findings and Conclusions on the three aforementioned areas at the Prehearing Conference (January 9, 1979 Transcript, pp. 124-6). The parties then offered written testimony supporting their joint positions at the evidentiary hearing; no one present objected to the offers of proof or the positions of the parties as reflected in the jointly Proposed Findings and Conclusions (January 25, 1979 Transcript, pp. 290-1; 293-4). The proposed Findings and Conclusions on "Structural Engineering", "Systems Engineering", and "Reliability and Safety" are set forth in subsections 2,3, and 4, respectively, following.

These three areas are not, however, the only areas which relate to the reliability and safety of the proposed project; the area of "Geotechnology" also plays a significant part. This broad issue was the subject of disagreement between the Staff and Applicant and, accordingly, was adjudicated by the Committee. Subsection 5, following, contains a discussion of the proceedings

thusfar as related to the area of Geotechnology.

The proposed Findings and Conclusions on the areas of Structural Engineering, Systems Engineering, and Reliability and Safety, adopted by the Committee for the purpose of this Preliminary Report, follow:

PROPOSED FINDINGS AND CONCLUSIONS
STRUCTURAL ENGINEERING

Findings

1. The Applicant has proposed that the structural design of the power plant for other than seismic loads will be in accordance with the Uniform Building Code augmented with special power plant loads not covered by the UBC.
2. The proposed structural design criteria for other than seismic loads are adequate for the purposes of the NOI.
3. The design live loads for which the facility will be designed, in addition to those specified in the Uniform Building Code, will be the loads of the heavy equipment which will be placed in the building. These loads have not yet been determined. The Applicant has agreed to provide these loads prior to or at the time of the AFC filing.
4. The Applicant intends to design the power plant structure for a seismic loading condition based on the Maximum Credible Earthquake, including the structural amplification of ground motions, together with code allowable stresses for seismic conditions. This approach, if properly executed, should result in calculated stresses corresponding to a MCE equal to or less than the yield strength of the materials of construction.
5. The seismic performance criteria for the proposed facility are as follows:
 - a) The damage due to the Maximum Credible Earthquake (MCE) will be restricted to minor structural damage without collapse.
 - b) The damage due to a Maximum Probable Earthquake (MPE) will be restricted to minimal, readily repairable damage.

6. Although the seismic performance criteria proposed by Applicant are qualitative rather than quantitative, these criteria are acceptable for the purposes of the NOI because they seem to be in accordance with the safety and reliability goals of: a) a short outage due to a seismic event of reasonable probability; and b) no structural collapse or loss of life due to an extreme event.

7. The Applicant's procedure in conducting "seismic risk analysis" consists of: 1) determining the probable peak ground acceleration (MCE) that may occur at the facility using accepted expected or predicted seismicity of the area and accepted attenuation formulas; 2) analyzing the effects of the earthquake loading upon the various components on the facility; 3) designing the various components to resist this loading.

8. The seismic design criteria for various individual mechanical and electrical components of the proposed facility (including, but not limited to, the turbine generator, surface condenser, Stretford equipment, cooling tower, water storage tank, and Stretford chemical storage tanks) is that the component shall resist a designated equivalent lateral force quoted as a percentage of the equipment weight applied at the equipment's center of gravity. Compliance with this criterion will be required by the Applicant's procurement specifications. These lateral forces will be related to peak bedrock acceleration for the site due to the MCE, but have not been determined at this time.

9. The Applicant has agreed to provide the specific equivalent lateral forces for the various components of the proposed facility, and to explain the methodology which it employs to determine these equivalent lateral forces (including the method used for determining structural amplification of ground motions), prior to or at the time of the AFC filing.

Conclusions

1. *The Applicant shall design and construct the proposed facility and its components as specified in Findings Nos. 1,3,4 and 8.*
2. *The Applicant shall design and construct the proposed facility to perform as specified in Finding No. 5.*
3. *The proposed structural design criteria, seismic performance criteria, and seismic design criteria are conceptually adequate for the purpose of this NOI. However, these criteria relate only to general design concepts, and the results of the application of these concepts cannot be determined until the AFC.*
4. *The Applicant shall provide information as specified in Findings No. 3 and 9.*
5. *No adjudication of this issue is necessary during the NOI.*

2. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions. The initially proposed version of the "Structural Engineering" section contained a Finding and a Conclusion which required resolution of the magnitude of the peak bedrock acceleration for the site. This item has been deleted by mutual agreement, in view of the joint proposed Findings in the "Geotechnical" section, following. A more complete explanation is also contained in Section IV. C.5., following.

PROPOSED FINDINGS AND CONCLUSIONS
SYSTEMS ENGINEERING

Findings

1. The Applicant has proposed to design the Bottle Rock power plant to include instrumentation which will provide alarms and/or initiate shutdowns for individual items of equipment, as follows:

a) Turbine Generator Unit:

- 1) Excessive vibration switch, alarm and trip.
- 2) Lateral motion switch on the turbine shaft, alarm and trip.
- 3) High lube oil temperature switch, alarm and trip.
- 4) Low lube oil pressure switch to shut down unit and start auxiliary pumps, alarm and trip.
- 5) Low lube oil sump level switch, alarm.
- 6) Overspeed switch, trip.
- 7) High hydrogen gas temperature and low purity hydrogen, alarm and trip.
- 8) Seal oil level switch and alarm.
- 9) Differential pressure switch, to prevent low differential pressure between the seal oil and hydrogen pressure, alarm and trip.
- 10) Generator moisture detector and alarm.
- 11) Vacuum switch to prevent low vacuum in the seal oil detaining tank, alarm and trip.

b) Condensers

- 1) Pressure switch to prevent condenser pressures from exceeding design levels, alarm and trip.
- 2) Condensate level switches to start and stop pump, prevent excessively high condensate levels in hotwell and alarms.

c) Cooling Towers

- 1) Float switches and indicators to start and stop the pump in the cooling tower overflow basin and provide alarms.
- 2) Vibration switches on each cooling tower fan.

d) Electrical System

- 1) Generator differential current trip.
- 2) Generator over-current trip.
- 3) Generator ground fault trip.
- 4) Generator anti-motoring trip.
- 5) Generator field ground trip.
- 6) Generator stator over-temperature alarm and trip.
- 7) Loss of excitation trip.
- 8) System negative phase sequence trip.
- 9) Transformer differential current trip.
- 10) Transformer over-current trip.
- 11) Transformer ground fault trip.

- 12) Transformer sudden pressure trip.
- 13) Transformer winding temperature alarm.
- 14) Transformer oil temperature alarm.
- 15) Transformer oil level alarm and trip.

2. The list set forth in Finding No. 1 above is adequate for the purposes of the NOI. The Applicant will provide a detailed description of the conditions which would cause plant shutdown and an updated list of the instrumentation which will provide alarms and/or initiate shutdowns for individual items of equipment in the AFC filing.

3. The Applicant has not provided a description either of the procedures to be followed by a control operator to determine the appropriate response to an emergency or abnormal condition at the facility, or of the basis for a decision by the operator to shut the plant down. The Applicant has agreed to provide this information prior to or at the time of an AFC filing.

4. In providing the additional information referred to in Findings 2 and 3 above, the Applicant has agreed to specifically respond to the following questions:

- a) Where are the alarms to be installed?
- b) What functions and results occur when an alarm is initiated?
- c) What mechanical/electrical devices are used to relieve or correct abnormal conditions in the plant and what specific functions does each device provide?
- d) What system or what operating and maintenance procedures will be utilized to check the monitoring system and at what frequency?
- e) On what systems will the Applicant install redundant or other forms of devices which will operate in case of failure of a primary device that is used to relieve or correct abnormal conditions in the plant? Provide the rationale, if redundancy is not to be employed for any such system.

Conclusions

1. *The Applicant shall provide the information specified in Findings 2, 3, and 4.*
2. *Subject to further evaluation during the AFG, the writ is acceptable from the standpoint of systems engineering.*
3. *No adjudication of this issue is necessary during the NOI.*

3. Committee Findings and Conclusions

The Committee adopts, as preliminary, the foregoing Findings and Conclusions.

PROPOSED FINDINGS AND CONCLUSIONS
RELIABILITY AND SAFETY

Findings

1. *The Applicant's performance criteria for the proposed Bottle Rock power plant will be essentially the same as for existing units of other utilities at the Geysers geothermal field, i.e., a capacity factor of 80% (lifetime average), an availability factor of 90%, and a forced outage rate of 3.1%.*
2. *In order to meet these criteria, the Applicant will utilize its own plant operating experience (non-geothermal), the geothermal experience acquired by PG&E at similar plants in the area, and the expertise of DWR's consulting engineer, Bechtel. Additionally, the Applicant will require in its procurement specifications that manufacturers submit quality control programs to the Applicant for approval, primarily for the "major" pieces of equipment, will inspect equipment at the manufacturer's factory, and will require a 3-year guarantee on equipment which it purchases.*
3. *However, the Applicant has not provided sufficient information to demonstrate that it has established adequate criteria with respect to redundancy of critical components, reliability analysis, and quality control.*
4. *In order to resolve the issue referred to in Finding No. 3, the Applicant has agreed to provide, prior to or at the time of an AFC filing, the following information:*
 - a) *More detailed criteria for redundancy, related to the consequences of forced outages.*
 - b) *More detailed criteria for reliability analysis to determine the appropriate level of quality control and inspection for components essential to power generation.*

- c) *Criteria for acceptability and approval of vendor's quality control program.*
- d) *Applicant's plans for verification of implementation of quality control program, and verification of conformity to stated requirements.*
- e) *In lieu of a and b, above, the Applicant may describe to what degree they will rely on PG&E's operating experience:*
 - i. *Will all features incorporated successfully by PG&E be utilized?*
 - ii. *If not, identify any and all exceptions with justification for each.*
 - iii. *Will the equipment be purchased from the same manufacturer?*

To what extent?

5. *In addition, the Applicant agrees to designate which power plant and related facility components are critical for project reliability and to justify such designations at or prior to the time of the AFC filing.*

6. *Staff agrees that the Commission staff will provide the Applicant with detailed information on the level of detail necessary to allow the Applicant to prepare an adequate AFC filing with respect to the matters set forth in Finding No. 4 by January 31, 1979.*

7. *In constructing and operating the proposed plant and related facility, the Applicant will comply with all relevant standards and requirements pertaining to fire protection and occupational safety promulgated by CAL-OSHA which are contained in Title 8 of the California Administrative Code.*

8. *Hazardous, toxic, or flammable substances or chemicals which are to be used or stored on the proposed site, and the method for handling and transporting these substances to assure the safety of plant personnel and the general public, are as follows:*

- a. Propane - approximately 500 gallons stored in an American Society of Mechanical Engineers code tank for unfired pressured vessels, Section III. Propane will be delivered in a tank truck and pumped into a storage tank (ASME Code).
 - b. CO₂ - approximately 20 - 75-pound cylinders conforming to the requirements of the Interstate Commerce Commission (ICC) specifications for the ICC 3A or 3AA seamless steel cylinders; CO₂ will be delivered by truck in 75-pound cylinders and stored in the plant as standby or reserve cylinders.
 - c. Stretford chemicals - approximately 15 steel shipping drums filled with dry form chemicals. Stretford chemicals in dry form will be delivered by truck, stored in their containers in a storage room located in the control building for the Stretford Process equipment.
 - d. H₂ - approximately 3000 cubic feet of Hydrogen will be stored in ICC approved containers. Hydrogen will be delivered in tube type transport trailers. Two trailers will be stored at the plant at all times in a double concrete trailer port. While one trailer is in use, the other will serve as a spare.
 - e. Oils (turbine and transformer) - will be stored in steel shipping drums of ASME, Section VIII of the Unfired Pressure Vessels code, steel tanks in an enclosed concrete block storage room complete with CO₂ protection systems, fire doors and ventilation dampers in accordance with NFPA codes.
9. In order to prevent accidental spills of these substances in the event of the MCE or MPE, all tanks, storage bins, and cylinders will be designed to resist a designated lateral force applied at the bodies' center of gravity. The Applicant has agreed to indicate what these lateral forces will be at or prior to the AFC filing.

Conclusions

1. *The Applicant shall design, construct and operate the proposed project as specified in Findings 2, 7, 8 and 9.*
2. *The Applicant shall provide the information specified in Findings 4, 5 and 9.*
3. *With the implementation of the measures referred to in Findings 7 - 9, the proposed project is acceptable from the standpoint of plant safety.*
4. *Given the Applicant's agreement to provide the information specified in Findings 4 and 5, the proposed project is acceptable from the standpoint of plant reliability for the purposes of the NOI.*
5. *No adjudication of this issue is necessary during the NOI.*
6. *The Staff shall provide the information specified in Finding 6.*

4. Committee Findings and Conclusion

The Committee adopts, as preliminary, the foregoing Findings and Conclusions. The Committee understands that "reliability" as used herein refers only to the power plant site and 1.2 mile tap line (1/9/79 Transcript, pp. 125-6).

At the Prehearing Conference, and in the Committee NOTICE and ORDER of January 12, 1979, the Committee ordered the Staff and Applicant to provide mutually agreeable definitions of the terms "availability factor", "capacity factor", and "forced outage rate". The parties' February 5, 1979 joint response was as follows:

A. Lay Definitions: (intended to show general application of terms)

AVAILABILITY FACTOR: A percentage expressing the time during which the power plant was available for production regardless of whether or not electricity was actually produced.

CAPACITY FACTOR: A percentage expressing the total amount of electricity actually produced relative to the total amount of electricity that the power plant was designed to produce during a given period of time (usually on an annual basis).

FORCED OUTAGE RATE: the percentage of time during which the power plant was unavailable for production because it was forced out of service, as opposed to being scheduled out of service. (Forced outage is defined as the occurrence of a component failure or other condition which requires that the unit be removed from service immediately or up to and including the very next weekend.)

B. Technical Definitions: (intended for specific application to proposed project)

1. Capacity Factor =

$$\left[\frac{\text{Total Gross Generation in MW-HR}}{\text{Period Hours } ^{(1)} \text{ (8760 hrs) x Maximum Dependable Capacity } ^{2/}} \right] \times 100\%$$

2. Availability Factor =

$$\left[\frac{\text{Available Hours } ^{3/}}{\text{Period Hours } ^{(1)} \text{ (8760 hrs)}} \right] \times 100\%$$

3. Forced Outage Rates =

$$\left[\frac{\text{Forced Outage Hours } \frac{4}{}}{\text{Period Hours (8760 hrs) } \frac{1}{}} \right] \times 100\%$$

1. Period Hours: The clock hours in the period under consideration.
(8760 hrs or 1 year for the purposes of the Bottle Rock proposal)
2. Maximum Dependable Capacity is the dependable main-unit capacity winter or summer whichever is smaller.
3. Available Hours: The time in hours during which a unit or major equipment is available; SH + RSH.
 - a. Reserve Shutdown Hours (RSH): Reserve shutdown duration in hours.
 - b. Service Hours (SH): The total number of hours the unit was actually operated with breakers closed to the station bus.
4. Forced Outage Hours: The time in hours during which a unit or major equipment was unavailable due to a Forced Outage.
 - a. Forced Outage: The occurrence of a component failure or other conditions which requires that the unit be removed from service immediately or up to and including the very next weekend.

5. Geotechnology

a. Prehearing Conference

The Staff and the Applicant submitted separate Statements of Proposed Findings and Conclusions on the issue of Geotechnology at the Prehearing Conference (Staff Statement dated January 2, 1979; Applicant Statement dated December 27, 1978). During the Prehearing Conference, the Staff and the Applicant agreed on the acceptability of Staff's proposed Finding 1 and Applicant's Proposed Findings 2 through 5 and Conclusion 1 dealing with seismic criteria for design of critical structures, in lieu of Staff's proposed Findings 2-6 (January 9, 1979 Transcript, pp. 138-47). The parties also agreed on the acceptability of DWR's proposed Finding 1, as amended at the Prehearing Conference, on the "seasonally wet area", as well as DWR's proposed Conclusions 1 and 2 in lieu of Staff's proposed Findings 13 and 14 (January 9, 1979 Transcript, pp. 147-9). The parties, however, indicated that substantial disagreement still existed regarding the issue of "Steam wells: damage by fault movement" covered in a separate section of the Applicant's Statement and in proposed Findings 7 through 13 of the Staff Statement on Geotechnology. The Staff and Applicant both indicated the necessity of litigating this geotechnical issue and their readiness to present testimony supporting their respective positions (January 9, 1979 Transcript, pp. 149-51).

b. Evidentiary Hearing

In the January 12 Hearing Order, the Committee notified the parties that the issue of "Steam Wells: damage by fault movement" would be adjudicated at the January 25 evidentiary hearing. The Committee also ordered the Staff to prepare and serve a supplementary position paper dealing with its apparent change in position from that taken in the Geysers Unit 17 geothermal power

plant NOI proceeding (78-NOI-3) concerning the seismic design value of 0.4g (Item 5; Finding 4, following; see also January 9, 1979 Transcript, pp. 141-5).

At the evidentiary hearing, the parties submitted written testimony supporting the joint proposed geotechnical Findings and Conclusions as specified above. The issue of fault movement damage to steam wells still remained in dispute. Accordingly, each party proceeded to offer written and oral testimony, which was subjected to cross-examination by the other party, and other statements and documents concerning this issue.*

Evidence offered on behalf of Applicant was characterized by counsel as intended to establish (January 25, 1979 Transcript, pp. 407-09):

- o The fault running through the Francisco leasehold and apparently beneath the sump next to the Francisco drill pad is a minor, relatively insignificant fault;
- o This fault is not seismically active;
- o There is no indication of fault displacement along this fault;
- o The possibilities of earthquakes occurring along this fault are insignificant;
- o The wells which would be drilled from the two proposed well pads would intersect the fault;

*The Applicant was represented by an attorney from McCulloch Geothermal Corporation. Counsel emphasized that McCulloch did not wish to be considered a party to the proceeding and specifically reserved the right to challenge the Commission's jurisdiction "as to any other matters relating to the geothermal wells" (January 25, 1979 Transcript, pp. 402-03). The Committee's view of the extent of Commission jurisdiction is contained in subsection 5.e., following.

- o The design of the wells and the casing which would be used would withstand forces of a magnitude greater than that which could be expected; and,
- o Steam wells in The Geysers have, despite seismic activity in the region, remained in production and the power plants have not been subjected to interference in steam supply due to seismic events.

Staff's original position concerned geotechnical hazards to the wells drilled from the Francisco well pad. Staff felt that if a potentially active fault identified by Applicant as passing through the wells' sump pond dipped to the northeast (as characteristic for this particular region of the Geysers KGRA), then subsequent minor movement along the fault plane might transect steam wells drilled from the pad, at some depth, depending upon the inclination of the fault plane, and cause a rupture of the steel well casing which could result in well failure or a possible blowout.

Staff counsel indicated that Staff's position revolved essentially around a lack of information relating to the activity or inactivity of the sump pond fault. In view of the testimony put forth by Applicant, Staff stated that it would be necessary to reevaluate its previous position in order to ensure that the proposed project and its associated facilities could be constructed in a reliable, environmentally acceptable manner (January 25, 1979 Transcript, pp. 540-41).

After the conclusion of the evidentiary hearing, a Brief and Proposed Findings and Conclusions on Geotechnology issues on behalf of DWR were submitted on February 2, 1979. The Staff submitted its post-hearing Brief on February 15, 1979, and Applicant submitted a Reply Brief on February 28, 1979.

c. Resolution

The Applicant, in its Brief of February 2, 1979, proposed five Findings and two Conclusions on the issue of potential damage to the steam wells by fault movement (Applicant's Brief, February 2, 1979, pp. 14-15). Staff, in its February 15, 1979 Brief, raises objections to the arguments and characterizations propounded in Applicant's Brief,* but nevertheless concludes:

"In light of the new evidence which the Applicant has submitted, it is the Staff's position that the issue which the Staff initially raised is no longer a significant concern. Accordingly, the Staff believes that the evidence supports the Applicant's Proposed Findings and Conclusions, if they are modified to indicate that there is a potential for movement along this fault." (Staff Brief, February 15, 1979, p. 21).

Modifications espoused by Staff affected Findings 1, 3, and 5, and Conclusions 1 and 2 as proposed by DWR in its first Brief (February 2, 1979, pp. 14-15). In its February 28 Reply Brief, DWR acquiesced in the Staff's modifications enumerated above. Staff, however, proposed two modifications with which DWR continues to disagree.

First, Staff would insert language (underscored) so that one of the proposed Findings would read:

"There has, as yet, been no history of well failure due to fault movement or seismic activity in The Geysers KGRA."

Secondly, Staff would delete an entire Proposed Finding which, in DWR's estimation, would read:

"Wells for the Bottle Rock Power Plant will be designed to withstand stress and pressure far in excess of any anticipated on the Francisco leasehold." (Applicant's February 2, 1979 Brief, p. 14, lines 13-16, Finding 4).

*For further elucidation, see Staff's Brief, pp. 10-21.

d. Committee Findings and Conclusions

First, the evidence of record, including the expert testimony, documents, and exhibits, amply supports the proposed Findings and Conclusion as modified by the Staff and acquiesced in by the Applicant. The Committee therefore adopts these, as preliminary, as proposed Findings 1,2,3, and 5 and Conclusion 1 on "Steam Wells: Damage by Fault Movement", following.

Second, the Committee does not adopt the addition to proposed Finding 4 urged by Staff. Addition of the phrase "as yet" so that the sentence would begin "There has been, as yet, no history..." is redundant and, as Applicant states, argumentative. The term "history" by definition refers to a chronology of past events; to insert a qualifying phrase such as "as yet" implies that the chronology is incomplete or inaccurate. The inaccuracy is especially pronounced in that the modifying phrase would imply a possible future contingency which, by definition, could not be included in a "history" dealing with past events. The Committee deems the term "history" sufficient to convey the meaning intended by the context of the proposed Finding. This version is therefore included as Proposed Finding Number 4 on "Steam Wells: Damage by Fault Movement" on the following pages.

Finally, the Committee has included, as preliminary Finding Number 6, a modified version of Applicant's proposed Finding 4 (Applicant's February 2, 1979 Brief, p.14). The evidence of record concerning rupture of well casing caused by fault movement indicates that the steam supplier (McCulloch) will utilize well casing accepted by the industry as sufficient for its intended purpose (January 25, 1979 Transcript, pp. 475-502). While the well casing itself cannot be invulnerable to any fault movement or possible contingency, the

Committee believes that a showing of reasonable precaution will suffice for purposes of the NOI. The language of the preliminary Finding has therefore been altered to reflect this concern.

The preliminary Findings and Conclusions on the area of Geotechnology follow:

PRELIMINARY FINDINGS AND CONCLUSIONS
GEOTECHNOLOGY

Seismic Criteria for Design of Critical Structures

Findings

1. *There is a need for the Commission to conduct a generic workshop in order to reach agreement on a number of important physical parameters which describe the activity of Maacama fault and its hazard to the proposed site, including: fault, length, type of activity, fault rupture length, earthquake magnitude, and anticipated peak bedrock acceleration.*
2. *DWR's consultant, Dr. Bolt, believes 0.35g should be the expected bedrock acceleration at the site.*
3. *The U.S. Geological Survey, CDMG and ATC 3-06 all have published information showing expected accelerations should be 0.3g, or less, at the site.*
4. *The CEC previously accepted 0.4g as appropriate seismic design criteria for critical structures at the nearby Geysers Unit 17. The CEC did not accept the acceleration values recommended for Geysers Unit 17 in the CDMG memorandum of May 26, 1978.*
5. *The Bottle Rock site and Geysers Unit 17 are so close the same seismic criteria should be used at both plant sites.*

Conclusion

1. *Applicant shall use a seismic criteria of 0.4g bedrock acceleration for the design and construction of critical structures.*

Seasonally Wet Area

Finding

1. Applicant will perform exploratory work needed to determine proper treatment of the seasonally wet area immediately north of the proposed site. Once exploration is undertaken and any problem defined, the Applicant will resolve it using safe engineering design and proper construction practices.

Conclusions

1. Applicant will follow procedures outlined in Finding Number 1.
2. These procedures will provide suitable mitigation for the wet area.

Steam Wells - Damage by Fault Movement

Findings

1. Faults and resultant fractures are essential for steam production. All wells are designed to intersect faults or fractures within the steam reservoir to provide a continuous supply of steam for a power plant.
2. History of earthquake activity in the Geysers Geothermal Field indicates very minor movement on faults.
3. Movement on the two-mile-long potentially active fault in the southwestern portion of the Francisco well pad so as to affect the casing on the existing or future wells is not anticipated.
4. There has been no history of well failure due to fault movement or seismic activity in the Geysers KGRA.
5. All wells drilled from the Francisco pad will be directionally drilled intersecting the above-mentioned fault at depth and other faults at depth within the steam reservoir to ensure reliability of steam production.

6. Wells for the Bottle Rock power plant will be designed to withstand stress and pressure greater than that reasonably anticipated from zone displacement movement along the faults on the Francisco leasehold, but shear movement along the faults could result in a temporary reduction of steam supply to the proposed power plant.

Conclusion

1. *Even though it is possible that fault movement might occur during the lifetime of the power plant, such movement, although it might cause a temporary reduction in steam supply, will not permanently affect the reliability of the Bottle Rock power plant and should not cause any adverse environmental impacts.*

e. Points of Clarification

First, the Staff has stated that generic proceedings involving geothermal developers at the Geysers (such as Pacific Gas and Electric Company, DWR, and the Northern California Power Agency) are necessary to assess several physical parameters concerning the activity of the Maacama fault. The Committee recognizes the need (see Finding 1 on "Seismic Criteria"), and endorses and encourages Staff's effort to develop an agenda for generic hearings dealing with this matter.

Second, the Committee ordered the Staff to explain its apparent change in position concerning the use of 0.4g as appropriate seismic design criteria for critical structures (see Finding 4, "Seismic Criteria"). The Committee became concerned with this matter because of the Staff's position in the PG&E Geysers Unit 17 proceeding (78-NOI-3), and its apparent acceptance of the 0.4g figure in that case and its initial reluctance to accept that figure in the present case (January 9, 1979 Transcript, pp. 141-5).

The Staff submitted a supplementary position paper on Geotechnical and Structural Engineering issues on January 18, 1979, in response to the Committee's Order. This supplementary paper was entered into evidence at the evidentiary hearing. In summary, the supplementary paper indicates:

- the Staff has not changed its position regarding evaluation of the seismic conditions perceived at the site;
- the proposed Findings and Conclusions speak to the use of 0.4g as peak bedrock acceleration in lieu of the Maximum Credible Earthquake peak bedrock acceleration as the basis for seismic design of the facility; this is considered suitable and should ensure reliable seismic performance, provided that all other design criteria remain unchanged;
- Staff does not necessarily agree with the rationale used to achieve the 0.4g peak bedrock acceleration value, although it does accept the value itself;

- °The California Division of Mines and Geology (CDMG) submitted only their evaluation of the seismic conditions affecting the PG&E Geysers Unit 17 site, along with estimates of peak rock acceleration associated with the MPE and MCE. The Commission accepted the CDMG evaluation and the estimated acceleration values as a means of comparing and evaluating the data submitted in the NOI;
- °DWR had misconstrued an effective ground acceleration of .4g to represent a peak bedrock acceleration of .4g; these two values are not equivalent; and
- °the .4g peak bedrock acceleration should not be considered to represent the MCE for the Maacama fault.

Finally, McCulloch Geothermal Corporation, the steam supplier, has specifically reserved the right to challenge Commission jurisdiction over matters relating to the geothermal wells (January 25, 1979 Transcript, pages 402 and 403; see also pages 534-537). As stated in Applicant's February 2, 1979 Brief (page 12, L 16-26):

"It is Applicant's position that the California Environmental Quality Act ('CEQA') and the Warren-Alquist State Energy Resources Conservation and Development Act ('Energy Act') [Public Resources Code Division 15, Chapter 6] clearly assign responsibility for the environmental impacts of steam field development on the Francisco lease to the County of Lake, as lead agency. The operation of specific geothermal wells is also under the jurisdiction of the DOG [California Division of Oil and Gas]. The responsibilities of the Energy Commission are thus limited to a CEQA review of the power plant and its related facilities. The geothermal wells are not related facilities for purposes of the Energy Act."

The Applicant's Brief continues (Id., page 13, L 14-19):

"Thus, the Commission's responsibilities under CEQA and the Energy Act should be to specifically analyze the environmental impacts of the power plant site, the power plant, and its related facilities. The Commission's EIR should only generally discuss the geothermal wells and their related facilities."

Staff's position is that:

"...the Commission is not merely entitled to conduct as [sic] additional environmental review of steam field development in connection with its evaluation of a proposed power plant; rather the Commission is required to conduct such a review when additional environmental impacts, not discussed in a previous EIR, may be anticipated." (Staff Brief, February 15, 1979, page 24; emphasis in original.)

The Staff then continues in its Brief (Id., pages 24 and 25):

"Similarly, geothermal wells and steam transmission facilities which would have to be constructed in connection with the certification of new geothermal power plant [sic], although not part of 'project' for the purposes of the Commission's jurisdiction... would be part of the 'project' for the purposes of CEQA". (Emphasis in original)

The Applicant challenges the foregoing characterization in its Reply Brief of February 28, 1979:

"The Warren-Alquist Act... limits the Commission's permitting authority to the power plant and its related facilities. ***However, as to the geothermal wells and steam transmission lines, the County of Lake is the lead agency.... To require the Energy Commission to undertake a specific EIR as to full field development would be inconsistent with the regulatory scheme created by CEQA. Such an undertaking by the Commission would be futile in that the Commission has no jurisdiction to require the steam field developer to adopt mitigation measures or to revoke the completed action of the local lead agency in granting a use permit." (Applicant's Reply Brief, February 28, 1979, Page 4, L 8-25)

At the evidentiary hearing, a representative of McCulloch Geothermal stated that the EIR for the development field would include consideration of the impact of the proposed power plant (January 25, 1979 Transcript, pages 536-7).

The Committee specifically reserves decision on this jurisdictional issue because it is not yet ripe for review; there is, at this point, no need to assert, or attempt to assert, jurisdiction over the steam field developer, especially in light of the cooperation received thusfar. However, should the need arise, the Committee will be guided by the Commission's Geothermal

Policy Report (adopted March 22, 1973), which states in part:

"Assertion of Commission jurisdiction over wells and pipelines would be potentially disruptive, and appears unnecessary in any event." (Geothermal Policy Report, p. 19)

This, however, should not be construed as precluding Commission involvement in steam field development, should the need arise. Referring to CEQA considerations, the Geothermal Policy Report continues (p. 21):

"Even though the Commission would exercise regulatory jurisdiction only over the geothermal power plant, the environmental evaluation of a power plant project must necessarily embrace a consideration of preceeding, concurrent and future field development. The Commission is the Lead Agency, within the meaning of CEQA, for the preparation and approval of the EIR on a site and related facility (Public Resources Code Section 25519). Before granting a permit for any project, the lead agency must consider the cumulative impacts of the project as a whole. The [Geothermal Policy] Committee believes this requirement can be met only by considering of [sic] the cumulative impact of field development and power plant construction and operation."

Finally, the Commission recognizes that it is not productive or efficient to recreate an environmental review already undertaken by another "lead agency" when considering the impacts of steam field development. The Commission's Geothermal Policy Report states (p. 32):

"One of the goals of the ... geothermal regulatory program is to minimize

duplication of effort among local, state and federal permitting agencies."

As an example of means to eliminate duplication the Report (p. 35) notes that, with respect to the DWR/McCulloch Geothermal Project,

"Commission staff is coordinating, to the extent possible, with the county and the applicants to utilize a common data base for the county EIR and the Commission's NOI process."

At this time, the Committee believes the foregoing guidelines are appropriate in the present case.

V. ISSUES REQUIRING FURTHER REVIEW

A. Introduction

The first basis for identifying issues that may require further consideration in proceedings on DWR's proposal to construct and operate its Bottle Rock geothermal project lies in the Findings and Conclusions presented in the foregoing sections. Several of these Findings and Conclusions reference information, studies, or reports that DWR has agreed to provide prior to or at the time of filing the Application for Certification, should the Commission approve the Notice of Intention. The questions to which this additional information relates remain unanswered. The second source of issues that require further consideration is the statements made by various participants and the discussions that have ensued during the proceedings to date on the Notice, as described in Section I.C.

The preceding Findings and Conclusions indicate that the areas of "Hydrology" and "Water Resources" would require no adjudication at the AFC stage. The areas of "Civil Engineering/Solid Waste Management" and "Cultural Resources" may also, depending upon evaluation of forthcoming data, require no adjudication at the AFC. Additional information is to be submitted on the subjects of "Air Quality", "Biological Resources", "Civil Engineering/Solid Waste Management", "Cultural Resources", "Geotechnology", "Need/Demand Forecast Compliance", "Noise", "Public Health", "Reliability and Safety", "Socioeconomics", "Soils", "Structural Engineering", "Systems Engineering", and "Water Quality". The following subsection summarizes the information yet to be submitted for each area. The next subsection lists questions that the Committee plans to consider in making its recommendations on the DWR Bottle Rock Notice, and a brief description of the information which the Committee expects to receive concerning

each question. In most cases, the information required to resolve outstanding questions will not be available until DWR files an AFC for its Bottle Rock geothermal project.

Under these circumstances, unless new information is presented at hearings on the Preliminary Report, the Committee will issue its Final Report to the Commission based largely upon information available to date. DWR, Staff, interested public agencies, and the public are therefore invited to state their views during hearings on the Preliminary Report as to whether or not the NOI for the DWR Bottle Rock geothermal project should be approved.

B. Information Yet to be Submitted and Additional Tasks to be Performed

The following section contains a listing and a brief summary, on a subject-by-subject basis, of the information yet to be submitted and/or tasks yet to be performed.

<u>Area</u>	<u>Information and Tasks*</u>
Air Quality	Specification of control system or systems, or other pertinent information, verifying that the steam supplier will be able to comply with LCAPCD Rule 411; air quality impact analysis; Staff submission regarding status of applicable NSR rules; sufficient operating data from PG&E Unit 15 to determine, with reasonable certainty, that the Stretford Unit's performance efficiency and the partitioning efficiency of the surface condenser will be sufficient to meet specified H ₂ S emissions limitations, or specific proposals for condensate treatment systems which will be installed prior to commercial operation of the proposed project; detailed information on the method of control during steam stacking; detailed information demonstrating that the manual and automated valve shut-in and/or supplemental systems will reduce H ₂ S emissions to the level of abatement necessary not to result in a "measurable contribution" ("Air Quality" Findings 3, 5, 14, 16, 25, 26, 27; Conclusions 5, 6).

*To be submitted and/or performed at the time the AFC is filed unless otherwise indicated.

<u>Area</u>	<u>Information and Tasks*</u>
Biological Resources	Specific description of grassland areas qualifying as areas of critical concern and basis for such classification; detailed mitigation measures for wildlife habitat loss associated with the development of the steam field and power plant site, including detailed discussion of how cumulative impacts of development of the power plant site and steam field can be mitigated; mitigation measures dependent upon final design of facility; detailed discussion of nature of monitoring programs. ("Biological Resources", Findings 14, 16, 18, 23; Conclusion 2).
Civil Engineering/Solid Waste Management	Specific design criteria for spoil area, if required. ("Civil Engineering/Solid Waste Management," Finding 3; Conclusions 1, 2).
Cultural Resources	Applicant has submitted study to determine significance of archeological resources at sites CA-LAK-609 and CA-LAK-610; description of interim mitigation measures for identified resources at sites 605, 609, and 610; staff will review. ("Cultural Resources," Findings 6, 7, 8; Conclusions 1, 2).
Geotechnology	Exploratory work needed to determine proper treatment of seasonally wet area. ("Geotechnology", Seasonally Wet Area, Finding 1; Conclusion 1).
Need/Demand Forecast Compliance	Verified and detailed data demonstrating the relative merit and cost comparison of purchase vs. self-generated power. ("Need/Demand Conformance," Findings 13, 16; Conclusion 1).
Noise	Detailed data demonstrating that the proposed project would produce a noise level no greater than 60 dBA at 500 feet. ("Noise", Finding 13; Conclusion 9).
Public Health	Proposal specifying the manner in which continued monitoring of H ₂ S concentrations will be effected; estimated ammonia emission rates and an analysis of the air quality impact of project ammonia emissions; estimated arsenic emission rates and resulting ambient arsenic concentrations; estimated mercury emission rates and an analysis of resulting ambient mercury concentrations; detailed information on a proposed ²²² Rn monitoring program, if necessary; information regarding the rate of TSP emissions during periods of steam stacking. ("Public Health": Hydrogen Sulfide, Finding 11, Conclusion 3; Ammonia, Finding 6, Conclusion 1; Arsenic, Finding 6, Conclusion 1; Mercury, Finding 8, Conclusion 1; Radionuclides, Finding 8, Conclusion 2; TSP, Finding 5, Conclusion 2).

<u>Area</u>	<u>Information and Tasks</u>
Reliability and Safety	Detailed criteria for redundancy, related to the consequences of forced outages; detailed criteria for reliability analysis to determine appropriate level of quality control and inspection for components essential to power generation; criteria for acceptability and approval of vendor's quality control program; plans for verification of implementation of quality control program, and verification of conformity to stated requirements; or degree to which PG&E operating experience will be relied upon; designation and justification of which power plant and related facility components are critical for project reliability; designation of lateral forces. ("Reliability and Safety," Findings 3, 4, 5, 6, 9; Conclusions 2, 6).
Socioeconomic Impacts	Applicant has submitted: information on the estimated costs of public services and estimated tax revenues; information on the availability of housing in the vicinity of the plant site. Staff will review. ("Socioeconomic Impacts," Findings 8, 10; Conclusion 5).
Soils	Specific schedules and designs for implementation of soil loss and erosion mitigation measures ("Soils," Finding 4, Conclusion 1).
Structural Engineering	Determination of design live loads; provide specific equivalent lateral forces for the various components of the proposed facility, and explain methodology employed ("Structural Engineering," Findings 3, 9; Conclusion 4).
Systems Engineering	Detailed description of conditions which would cause plant shutdown and updated list of instrumentation which will provide alarms and/or initiate shutdowns for individual items of equipment; description of procedures to be followed by a control operator to respond to emergency or abnormal condition, or basis for operator's decision to shut plant down. ("Systems Engineering," Findings 2, 3, 4; Conclusion 1).
Water Quality	Detailed design criteria for retention barrier and liner surrounding the entire plant; detailed description of the facilities, equipment, monitoring, operating, and reporting procedures necessary to assure that the spill retention systems will comply with all applicable regulations and standards; detailed water quality monitoring plan; specific details of proposed sewage disposal facilities and their operational capabilities ("Water Quality", Findings 6, 7, 8; Conclusion 3).

C. Issues and Information Requirements

As the foregoing listing indicates, a substantial amount of information remains to be submitted and considered before the Commission would issue a final approval or disapproval of the DWR Bottle Rock geothermal project. Final action will of course occur at the conclusion of the AFC proceeding, should the Commission approve the NOI. This next subsection therefore discusses principal areas of concern remaining for purposes of these proceedings that information yet to be submitted by the Applicant or other participants is intended to resolve.

1. General Considerations

The Committee is concerned with both the general, overall impacts of geothermal development in the Geysers area and the specific impacts of the proposed DWR Bottle Rock geothermal project. Regarding the general concerns, the Committee has identified six areas which require investigation on a broad scale:

- a. DWR's need for capacity, as discussed in Section II.A. of this Report;
 - b. Cumulative impacts of geothermal development on the biological resources of the Geysers area, as discussed in Section III.C.3. of this Report;
 - c. Public Health effects caused by geothermal development;
 - d. Air Quality impacts pertaining to Lake and Sonoma Counties caused by geothermal development;
 - e. Applicability of federal PSD regulations to geothermal development;
- and

f. Physical parameters of the Maacama fault, as discussed in Section IV.C.5. of this Report.

The Committee believes that while particular geothermal power plant proposals such as the DWR Bottle Rock project impact upon the aforementioned areas, these areas are also subject to more generalized impacts which have wide ranging implications due to the number of power plants actually operating or projected in the Geysers KGRA.* Due to the need for a coordinated plan dealing with the total scope of development in the Geysers, the Committee feels that the most expeditious manner of treating these common concerns would be in a forum dealing with the issues on a generic basis, such as a Generic Technology Assessment, or similar, proceeding. The Committee urges the Commission staff to develop agenda for such proceedings, and will endeavor to facilitate commencement of such proceedings in the near future.

In addition to the above mentioned general issues and considerations, there are certain somewhat narrower issues which the Committee believes must be addressed in the context of the present proceeding and concerning which the Applicant has agreed to submit clarifying information. These more particularized concerns are contained in the following subsections.

2. Air Quality and New Source Review

The Stretford H₂S abatement system treats H₂S which reaches the system in the gas stream. The amount of H₂S which reaches the Stretford system is dependent upon the amount of H₂S which the surface condenser is able

*At present, PG&E has 14 units operating, with one (Unit 16) in the NOI stage, another (Unit 17) in the AFC stage, and one more (Unit 18) expected to be applied for shortly; NCPA has one unit (No. 2) ready to enter the AFC stage; DWR's Bottle Rock project could be certified by the end of 1979.

to "partition" out of the steam and into the gas stream. The partitioning efficiency is thus critical to determining the abatement effectiveness of the Stretford system.

a. Question: What is the partitioning efficiency of the surface condenser?

Information Required: At the present time, the partitioning efficiency of the surface condenser is not known since data from one in use at a geothermal power plant are not yet available. PG&E's Unit 15, however, will utilize a surface condenser. Operating data from this unit should assist in determining the partitioning efficiency of the surface condenser proposed for use by DWR. If the surface condenser partitions less than 97 percent of the H_2S into the gas stream, the H_2S remaining in the stream condensate will require treatment if the plant is to meet a 13.2 lb/hr. limitation, or the limitation as determined by the air quality analysis required to meet New Source Review requirements, whichever is stricter. Since the partitioning efficiency of the surface condenser which would be used on the proposed project is not known, and since the ability of the proposed project to comply with applicable H_2S limitations is dependent upon the partitioning efficiency of the surface condenser, the Applicant has agreed to provide, by the time the AFC is filed, either:

1. Sufficient operating data from PG&E Unit 15 to determine, with reasonable certainty, that the Stretford Unit's performance efficiency and the partitioning efficiency of the surface condenser will be sufficient to meet a 13.2 lb/hr. H_2S emissions limitation; or
2. Specific proposals for condensate treatment systems which will be installed prior to commercial operation of the proposed Bottle Rock

project in the event that operating data from Unit 15 indicates that the partitioning efficiency of the surface condenser is not sufficient to meet specified H₂S emissions limitations ("Air Quality," Findings 19-25).

b. Question: How shall the Applicant demonstrate compliance with applicable Lake County Air Pollution Control District Rules?

Information Required: The Applicant shall perform an air quality impact analysis for the purposes of demonstrating compliance with applicable LCAPCD rules. Once this analysis is completed, the APCD and the Committee shall determine whether H₂S emissions from the proposed project will result in a violation of, or measurable contribution to the existing violation of, the H₂S standard. (Id., Findings 9, 13, 14, 18).

c. Question: What are the airborne emission rates and concentrations of H₂S and sulfur from the Stretford unit?

Information Required: The Applicant will supply relevant information concerning the Stretford unit's emission rates as soon as pertinent data from PG&E Unit 15 are available, or shall submit supplemental information as to the expected Stretford unit emission rates from the Stretford supplier by the time an AFC for the proposed project is filed. (Id., Finding 5).

d. Question: How shall the steam supplier (McCulloch) comply with particulate emissions during periods of steam stacking, in accordance with LCAPCD section 411?

Information Required: The Applicant has agreed to specify the control system or systems that will be used to provide information which will verify that the steam supplier will be able to comply with section 411. (Id., Findings 3,8).

e. Question: How shall the steam supplier (McCulloch) control steam stacking during plant shutdowns?

Information Required: The Applicant has agreed to provide detailed information on the method of control which would be used during periods of steam stacking. (Id., Finding 26).

f. Question: Will the manual and automated valve shut-in system achieve the level of H₂S abatement necessary for H₂S emissions from the steam release valve not to result in a "measurable contribution" to an existing air quality violation?

Information Required: The Applicant has agreed to obtain and provide, from the steam supplier, detailed information demonstrating that the manual and automated valve shut-in and/or supplemental systems will reduce H₂S emissions to the level of abatement necessary not to result in a "measurable contribution" to an existing air quality violation. (Id., Finding 27).

g. Question: What is the status of applicable New Source Review rules?

Information Required: The Staff shall submit a report indicating the status of applicable NSR rules at the time it submits its comments on this Report. (Id., Finding 16).

3. Biological Resources

a. Question: Are there grassland areas on the Francisco leasehold which have yet to be identified as areas of critical concern?

Information Required: Certain grassland areas may later be identified by Staff and Applicant as areas of critical concern; any such areas and the basis for

their classification shall specifically be described in the AFC filing. (Biological Resources, Finding 14).

b. Question: Has the Applicant developed detailed mitigation measures for wildlife habitat loss associated with the development of the steam field and power plant site?

Information Required: The Applicant has agreed to consult with the Department of Fish and Game to develop detailed mitigation measures for wildlife habitat loss, including a detailed discussion of how the cumulative impacts of the power plant site and steam field can be mitigated (Id., Finding 16).

c. Question: How shall the Applicant provide protection to off-site wildlife habitat and spawning areas?

Information Required: The Applicant has agreed to specify the necessary mitigation measures prior to or at the time of the AFC filing. (Id., Finding 18).

d. Question: How shall Applicant evaluate the actual impact of the project on biological resources?

Information Required: The Applicant will initiate several monitoring studies to evaluate the actual impact of the project on biological resources as soon as development at the project site has begun. The Applicant will provide a detailed discussion of the nature of these monitoring programs prior to or at the time of the AFC filing. (Id., Finding 23).

4. Civil Engineering/Solid Waste Management

a. Question: What will be the quantity and location of the spoil area?

Information Required: The Applicant shall provide specific design criteria for the spoil area at or prior to the filing of the AFC. (Civil Engineering/Solid Waste Management, Finding 3).

5. Cultural Resources

a. Question: What is the cultural significance of archeological resources at sites CA-LAK-609 and CA-LAK-610?

Information Required: The Applicant has submitted an additional study to determine the significance of these resources. The Staff shall review this study and report to the Committee. (Cultural Resources, Finding 6).

b. Question: What interim mitigation measures will the Applicant undertake to assure further damage to the identified resources at sites 605, 609, and 610 will be prevented prior to start of construction on the project?

Information Required: The Applicant has submitted a description of interim mitigation measures, and a commitment to abide by them. The Staff shall review and report to the Committee. (Id., Finding 7)

c. Question: What course of action will Applicant pursue, should further studies indicate that the identified archeological resources at sites CA-LAK-609 and 610 are significant?

Information Required: Should the identified sites be deemed significant, the Applicant shall submit a detailed mitigation plan as expeditiously as possible. (Id., Finding 8).

6. Geotechnology

a. Question: What is the proper treatment of the seasonally wet area immediately north of the proposed site?

Information Required: Applicant will perform exploratory work necessary to determine the proper treatment of this area, and will resolve any problem defined by using safe engineering design and proper construction practices. (Geotechnology-Seasonally Wet Area, Finding 1).

7. Need/Demand Conformance

a. Question: Has the Applicant submitted detailed and verified data demonstrating the relative merit and cost comparison of purchase vs self-generated power?

Information Required: At or prior to the AFC filing, the Applicant shall provide verified and detailed data demonstrating the relative merit and cost comparison of energy from the proposed project as compared to the cost of purchased power. (Need/Demand Conformance, Findings 13, 16).

8. Noise

a. Question: What noise level would be produced at 500 feet by the proposed power plant?

Information Required: Prior to or at the time of the AFC filing, the Applicant has agreed to provide detailed data demonstrating that the Bottle Rock power plant will produce a noise level no greater than 60dBA at 500 feet. (Noise, Finding 13).

9. Public Health

a. Question: How shall the level of H₂S exposure experienced by the local population be determined?

Information Required: The Applicant shall ensure that ambient H₂S concentrations continue to be monitored in the vicinity of the Bottle Rock plant, and has agreed to submit a proposal specifying the manner in which continued monitoring is to be effected at or prior to the AFC filing. (Public Health, Hydrogen Sulfide, Finding 11).

b. Question: What are the ammonia emission rates and what would be the air quality impact of project ammonia emissions?

Information Required: The Applicant has agreed to provide estimated ammonia emission rates and an analysis of the air quality impact of project ammonia emissions at or prior to the AFC filing. (Id., Ammonia, Ammonium Compounds, Sulfates, Finding 6).

c. Question: What are the arsenic emission rates and resulting ambient arsenic concentrations? The mercury emission rates and resulting ambient mercury concentrations?

Information Required: The Applicant has agreed to provide estimated arsenic and mercury emission rates, and analyses of resulting ambient arsenic and mercury concentrations, at or prior to the AFC filing. (Id., Arsenic, Finding 6; Mercury, Finding 8).

d. Question: Will concentrations of radon-222 from plant operations remain below applicable standards?

Information Required: Applicant will initiate a monitoring program to verify that concentrations of radon-222 from plan operations remain below applicable standards. DWR will therefore provide detailed information on a proposed radon-222 monitoring program, if necessary, at or prior to the filing of an AFC. (Id., Radionuclides, Finding 8).

e. Question: Is the information which has been provided thusfar adequate to determine that emissions from the steam release valve will not prevent the attainment, interfere with the maintenance, or cause a violation of the ambient air quality standard for Total Suspended Particulates (TSP) during periods of steam stacking?

Information Required: The Applicant has provided insufficient information to answer this question affirmatively, but shall provide additional information regarding the rate of TSP emissions during periods of steam stacking at or prior to the time of an AFC filing. (Id., TSP, Finding 5).

10. Reliability and Safety

a. Question: Has the Applicant provided information sufficient to demonstrate that it has established redundancy of critical components, reliability analysis, and quality control?

Information Required: The information provided thusfar by Applicant has been inadequate in this regard. However, prior to or at the time of the AFC filing, the Applicant shall submit: more detailed criteria for redundancy, related to the consequences of forced outages; detailed criteria for reliability analysis to determine the appropriate level of quality control and inspection for components essential to power generation; criteria for acceptability and approval

of the vendor's quality control program; plans for verification of implementation of quality control program, and verification of conformity to stated requirements. In lieu of the first two submittals above, the Applicant may describe to what degree it will rely upon PG&E's operating experience. (Reliability and Safety, Findings 3,4).

Applicant will also designate which power plant and related facility components are critical for project reliability, and justify such designations at or prior to an AFC filing. (Id., Finding 5).

b. Question: What precautions will be taken to prevent accidental spills of propane, CO₂, Stretford chemicals, hydrogen, and oils in the event of the Maximum Credible or Maximum Probable Earthquake?

Information Required: All tanks, storage bins, and cylinders containing the above substances will be designed to resist a designated lateral force applied at the bodies' center of gravity. The Applicant will indicate these lateral forces at or prior to the AFC filing. (Id., Findings 8, 9).

11. Socio-Economic Impacts

a. Question: Will the costs borne by the local jurisdictions (in particular, Lake County) as a result of the construction and operation of the proposed project be offset by the tax revenues derived from the project?

Information Required: The Applicant has submitted further information on the estimated costs of public services and estimated tax revenues. The Staff shall review and report to the Committee. (Socio-Economic Impacts, Findings 7, 8).

b. Question: Will adequate housing be available in Lake County to accommodate workers who move into the vicinity during project construction?

Information Required: The Applicant has provided additional information on the availability of housing in the vicinity of the plant site. The Staff shall review this information and report to the Committee. (Id., Findings 9, 10).

12. Soils

a. Question: What is the schedule or design for implementation of soil loss and erosion control mitigation measures?

Information Required: The Applicant shall provide the specific designs and schedules for the implementation of specified soils mitigation measures prior to or at the filing of the AFC. (Soils, Findings 3, 4).

13. Structural Engineering

a. Question: What are the specific equivalent lateral forces for the various components of the proposed facility, and how were they determined?

Information Required: At or prior to the AFC filing, the Applicant will provide the specific equivalent lateral forces for the various components of the proposed facility, and will also explain the methodology which it employs to determine these equivalent lateral forces, including the method used for determining structural amplification of ground motions. (Structural Engineering, Finding 9).

b. Question: What are the design live loads for which the facility will be designed?

Information Required: The design live loads for which the facility will be designed, in addition to those specified in the Uniform Building Code, will be the loads of the heavy equipment which will be placed in the building. These loads have not yet been determined, and the Applicant shall provide them by the time of the AFC filing. (Id., Finding 3).

14. Systems Engineering

- a. Question: Which conditions would cause plant shutdown?

Information Required: In the AFC filing, the Applicant will provide a detailed description of the conditions which would cause plant shutdown and an updated list of the instrumentation which will provide alarms and/or initiate shutdowns for individual pieces of equipment. (Systems Engineering, Finding 2).

b. Question: What procedures would be followed by a control operator to determine the appropriate response to an emergency or abnormal condition at the facility? To base a decision to shut the plant down?

Information Required: The Applicant has agreed to provide information responding to the above questions by the time an AFC is filed. (Id., Finding 3).

15. Water Quality

a. Question: What measures will be taken to protect against spills from the proposed project?

Information Required: The Applicant has proposed to construct an impermeable retention barrier and liner around the entire plant. DWR shall submit detailed design criteria for the retention barrier and liner prior to or at the time of the AFC filing. The monitoring and operating system for containing and controlling spills has not been designed as yet. By the time an AFC is filed, the

Applicant will provide a detailed description of facilities and equipment, and monitoring, operating, and reporting procedures necessary to assure that the spill retention systems will comply with all applicable regulations and standards. (Water Quality, Finding 6).

b. Question: How will the long-term impacts of plant construction and operation on High Valley and Kelsey Creeks be evaluated?

Information Required: The Applicant will assure that a monitoring program is established to evaluate these impacts and shall provide a detailed monitoring plan at or prior to the AFC filing. (Id., Finding 7).

c. Question: What sewage disposal facilities will Applicant use?

Information Required: Prior to or at the time of the AFC filing, DWR will provide specific details of its proposed sewage disposal facilities and their operational capabilities. (Id., Finding 8).

APPENDIX A
Timeline of Events

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TIMELINE OF EVENTS

NOI Filed	October 5, 1978
NOI Accepted by Executive Director	October 26, 1978
Commission Committee Appointed	November 8, 1978
Notice of Informational Hearings	November 8, 1978
Issue Workshops	November 9,17,21, 1978 December 7, 1978; January 23, 1979
Informational Hearings, Santa Rosa and Lakeport, CA	December 4, 1978
Notice of Prehearing Conference	December 20, 1978
Prehearing Conference Statement Workshops	December 21,22,27, 1978 ; January 9, 1979
Submission of Joint and Separate Prehearing Conference Statements	December 28, 1978 and January 2, 1979
Prehearing Conference	January 9, 1979
Hearing Order and Notice of Evidentiary Hearings	January 12, 1979
Submission of Joint Statement on Air Quality	January 19, 1979
Evidentiary Hearing	January 25, 1979
Submission of Applicant's Brief	February 2, 1979
Submission of Staff's Brief	February 15, 1979
Submission of Applicant's Reply Brief	February 28, 1979
Publication of <u>Preliminary Report</u>	March 26, 1979
Public Hearing on <u>Preliminary Report</u>	April 23, 1979
Written Comments on <u>Preliminary Report</u>	Until April 26, 1979

APPENDIX B

Following are comments on the
proposed project submitted by
members of the general public.

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CLEARLAKE MEDICAL GROUP, INC.
P.O. Box 1310
KELSEYVILLE, CALIFORNIA 95451
PHONE: (707) 279-8116

ENERGY COMMISSION
RECEIVED

NOV 16 1978



88-01-7

April 12th

Re Ann Schraaf.

RECEIVED
NOV 20 1978
HEARING OR

To whom it may concern
It is my opinion that hydrogen sulphide to the above named's respiratory passage is very deleterious. This patient's respiratory reserve is already severely compromised by long standing asthma and bronchitis and thus any further insults to patient's respiratory passage should be avoided at all costs. In the patient's interest I ask that atmospheric hydrogen sulphide be kept to as low a level as possible in the vicinity of this patient's house.

Yours sincerely,

[Handwritten signature]

Peter V. Madill, M.D.

public

Hq. ad.

NOV. 27, 1978

ENERGY COMMISSION

78-NOI-7

TO THE ENERGY COMMISSION RE: DOR BOTTRECK

NOV 21 1978

I moved to Lake County from the Bay Area in 1972. I had two basic reasons for the move. First and foremost, Clean Air, as I have a history of asthma. The other, quite country-side living.

For a little over 3 1/2 years I had no health problems. Then a steam well was drilled about 500 ^{1/2 mile} feet from my home.

It wasn't long before I started having problems getting my breath. This got progressively worse and sent me frantically for a doctor. I will not bore you with details of the next year and 1/2 but I will assure you when the wind blew in my direction from the steam well all I could do was take my pills, use the inhaler and sit down as it was hard work to breathe.

It wasn't until my second trip to Red Bull Hospital some years that I thought to tell my doctor that since the steam well was so near to my home, that perhaps you may have some data which would support the theory and not be a coincidence.

I have the doctor's Part A copy of a letter the doctor wrote in my behalf.

The point I'm trying to make here is that if this power plant is built in this proposed ~~area~~ it would raise the level of H_2S two fold around my home. Hydrogen Sulphide is deadly to some of us and at the very least harmful to the rest.

In May of this year I moved into my son's house at Whispering Pine. The purpose for this was to see for myself if being away from the steam well would make any difference in my health. I changed nothing in the way I live nor the medication I take. The only thing that changed was the air. In May I weighed 109 lbs. ~~I now~~ I now weigh 122 lb. + feel much better.

In closing I would pose a question. Has steam wells and power plants really become more important than human life?

Ann, I. Hunt

Cell. 300-1000

11/13/03

APPENDIX C

Following are comments on the proposed project submitted by local, state and federal public agencies.

APPENDIX C

<u>DATE</u>	<u>AGENCY</u>
January 12, 1979	State Department of Health Services - Kenneth Buell, Chief, Environmental Health Branch
December 18, 1978	Northern Sonoma County Air Pollution Control District (docketed in several Geysers area geothermal proceedings) - Michael W. Tolmosoff, APCO
December 13, 1978	State Solid Waste Management Board - Albert A. Marino, Executive Officer
December 7, 1978	State Department of Health Services (docketed in several Geysers area geothermal proceedings) - Harvey Collins, Acting Chief
December 6, 1978	State Water Resources Control Board - Larry Pearson, Executive Director Water Quality
November 30, 1978	State Board of Equalization - Douglas D. Bell, Executive Secretary
November 30, 1978	Lake County Air Pollution Control District - Steve Zalusky, Acting Director LCAPCD
November 30, 1978	CALTRANS, Division of Aeronautics - G. A. Miller, Deputy Chief Division of Aeronautics

<u>DATE</u>	<u>AGENCY</u>
November 28, 1978	State Solid Waste Management Board - Herbert Iwahiro, Chief Local Assistance and Planning Division
November 27, 1978	CALTRANS - R. J. Brown, Project Studies Engineer
November 20, 1978	Department of Fish and Game - E. C. Fullerton, Director
November 20, 1978	Department of Fish and Game - E. C. Fullerton, Director
November 16, 1978	U.S. Fish and Wildlife Service - James D. Carson for James J. McKeivitt, Field Supervisor

Memorandum

78-NOI-7

Date: January 12, 1979

Subject: Review of 78-NOI-7
Bottle Rock Power Plant

Attention: Wendy Reed, Project Manager

Telephone: ATSS ()
() 2-2073From: Environmental Health Branch
714 P Street, Room 430

We have completed our review of subject NOI, with particular emphasis on the sections in Chapter VII dealing with Solid Waste Management and Radioactivity, and have the following comments thereon.

We generally concur with the conclusion (Page XI-3 and -4) that operation of 11 electrical generating units does not currently add a significant increment of radioactivity to the environment of The Geysers area. However, the knowledge that the projected electrical capacity planned by Department of Water Resources (DWR) and others, and presumably the amount of radioactivity released as a consequence of this generation, will at least treble in the next few years, gives rise to our interest in the need for surveillance over the sources of radioactive emissions to the environment of this area.

Consequently, pursuant to Section 25607 of the Health and Safety Code, we have determined that power plants at The Geysers warrant surveillance for radioactive emissions. At an appropriate time we will request that DWR submit to us for review and approval a plan for appropriate monitoring of generating facilities to be built at The Geysers. Through such surveillance, we will periodically reassess the overall health impact of continuous releases of radon to the air by facilities in the area.

Thus, a commitment to a program for periodic monitoring and reporting of radioactive emissions from the Bottle Rock Plant should be provided by DWR at some stage in the certification process.

We appreciate the opportunity to comment on this NOI.

Kenneth Buell
Kenneth Buell, Chief
Environmental Health Branch

cc: Lloyd Harvego, Deputy Chief
Energy Division
Department of Water Resources
1416 Ninth Street, Room 452-59

P.L. Com. Reg. Sdr. 37

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT

141 NORTH STREET, HEALDSBURG, CA. 95448
(707) 433-5911 OR (707) 433-5742

78-NOI-3 December 18, 1978

78-NOI-6
78-NOI-7
State of California
Energy Commission
1111 Howe St., M.S. #15
Sacramento, Ca., 95825

ENERGY COMMISSION
RECEIVED

DEC 22 1978

RECEIVED
DEC 20 1978

THANNE D-

ATTENTION: COMMISSIONER SUSANNE REED

SUBJECT: NOI's (No. 16, 17, DWR, etc.)
FOR GEYSERS AREA

Dear Miss Reed:

I am very sorry to inform your agency this District will have to participate at a minimum level with your NOI/AFC procedures. This District just does not have the personnel to handle the volumunous quantity of notices, reports, meetings, etc. that is being produced by your agency. This District must continue with its primary function of permit processing, air monitoring and enforcement, which is very difficult when one is buried behind a desk or attending meetings which chew up 5 - 8 hours of time toward your agency. (For the future to keep up with your agency's barrage of paper, I strongly suggest you include a simple master calendar along with each "notice" so one can keep up with the "total picture!")

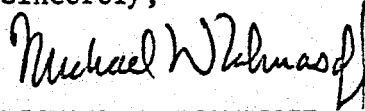
Therefore, this District, until sufficient time is available, will leave you with the following general statements applicable to all the "geothermal" projects in the Geysers area:

- (1) BACT should mean the ability to achieve 8gm/GMW-Hour or 99% level of abatement.
- (2) Each project air analysis should consider drainage conditions, limited vertical mixing and downwash conditions. If a study is warranted, then it should have District approval for overall design objectives.
- (3) Effectiveness of Stretford scheme and "partitioning of non-condensables" is not important as long as secondary H₂O₂ abatement is available.
- (4) Utilities should consider dual units until a satisfactory control system is found for steam transmission line stackings.
- (5) The Utility must improve its operational procedures toward shut down warning devices, curtailment rather than shut down and level of manpower to prevent extended shut downs.
- (6) The steam transmission line is within the jurisdiction of the APCD unless the utility becomes responsible for "stacking" during shut down.

Finally this District presently feels it will have to rely on its permit process to implement the law we are charged with. Therefore, please inform your applicants to file for District authorities to construct simultaneously with your NOI if this District is to parallel its efforts with yours (especially if some long-term study is needed by this District).

If you have any questions, do not send anymore "paper", but personally contact Mr. Michael W. Tolmasoff at (707) 433 5911.

Sincerely,



MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MWT/ak

cc: Steve Zalusky, Lake County Air Pollution District

Memorandum

Ms. C. Suzanne Reed
 Presiding Member
 Energy Resources Conservation
 and Development Commission
 1111 Howe Avenue
 Sacramento, CA 95825

Date: DEC 17 1978

ENERGY RESOURCES
 RECEIVED

DEC 15 1978

From : STATE SOLID WASTE MANAGEMENT BOARD

Subject: Prehearing Statement for the DWR Bottlerock Geothermal Power Plant.

My staff has carefully reviewed the Department of Water Resources' (DWR) Notice of Intention (NOI) for the Geothermal Bottlerock Power Plant. Based on their findings the Board will not act as an intervener in the hearing proceedings. Therefore, a prehearing statement will not be submitted on the Board's behalf.

However, we are submitting a position paper (attached) for your consideration. The paper addresses a number of concerns that should be discussed in the NOI hearing process. Your attention to these matters will be appreciated.

John Boss of my staff (322-8747) will have the primary responsibility for the Board's involvement.



Albert A. Marino
 Executive Officer

cc: Ms. Wendy Reid
 California Energy Commission

Attachment

Solid Waste Generation Potential of the Geothermal Bottlerock Power Plant

The staff of the Solid Waste Management Board (SWMB) has reviewed the Notice of Intention (NOI) for the geothermal Bottlerock Power Plant submitted by the Department of Water Resources (DWR) to the Commission. The review indicates that a number of items should be clarified in the hearing process.

1. A solid waste analysis should be conducted that includes an assessment of the types and quantities of construction waste generated by the project, its significance in relation to the present waste generation rates in the areas surrounding the candidate sites, and the impact on local solid waste disposal facilities.
2. A similar analysis should be included regarding the disposal of elemental sulfur generated by the Stretford Process. Since there are only a limited number of Class I and Class II-1 disposal sites available, adequate justification should be made for the disposal of elemental sulfur at these sites. Consideration should be given to recovering the elemental sulfur for marketing purposes. Sulfur can be used in the production of some fertilizers. Also research shows that sulfur can replace up to 50% of asphalt in asphaltic concrete mixes.
3. Clarification is needed regarding disposal alternatives of the purge stream resulting from the abatement of H₂S emissions via the Stretford Process. Apparently, the stream may be reinjected back into the wells, although plans are being developed to reclaim salts from the stream. Other plans indicate possible disposal of the waste at Class I or Class II-1 sites due to its hazardous nature. However, no analysis has been made to assess the quantity of the waste generated or the impact of disposing of it at local Class I or Class II-1 sites in relation to present waste generation rates.
4. An analysis is also needed to quantify the amount of mercury containing sludge that will be generated from the cooling towers. Since the applicant plans to dispose of it at local Class I or Class II-1 sites, the impact of its disposal should also be determined in relation to present waste generation rates.

Recommendations

Because these items have not been adequately addressed in the NOI, it is recommended that the Energy Commission staff extract sufficient information from the Department of Water Resources to clarify the issues in the hearing process.

The applicant should develop a plan whereby elemental sulfur from the Stretford Process can be recovered and possibly marketed. The plan should contain documentation relevant to the quantity of sulfur that can be recovered.

Memorandum

James A. Walker
Executive Director
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

78-NOI-5

78-NOI-6

78-NOI-7

78-NOI-3

DEC 15 1978

Date : December 7, 1978

Subject: Wastes from proposed
Geothermal Power Plants

Telephone: ATSS () 2-2337
()

From : Hazardous Materials Management Section
1420 5th Street, Room 140

Michael Batham, Stephen Ramirez, and Chris Oliveira of your staff asked if the Department of Health Services considers the following wastes from proposed geothermal power plants in the Geysers KGRA hazardous wastes:

1. The cooling tower condensate sludge;
2. The Stretford solution purge stream produced by the hydrogen sulfide (H₂S) abatement systems;
3. The non-saleable sulfur cake produced by the H₂S abatement system; and
4. The saleable sulfur cake produced by the H₂S abatement system.

Information on cooling tower condensate from Units 1 through 11 was received from the North Coast Regional Water Quality Control Board. Unfortunately, there are no data on heavy metals. We need such data to make a judgment.

Information contained in "Comparative Process Study for Pacific Gas and Electric Company--Hydrogen Sulfide Abatement Facilities for Geothermal Power Production Facilities--The Geysers, California" (Parsons, August 1975) indicate that the Stretford solution purge stream is a hazardous waste.

Based on Parsons, the non-saleable sulfur cake also is hazardous waste.

The saleable sulfur cake would be a hazardous material if the only difference between it and the non-saleable cake were dewatering. However, since it would not be a waste (if sold), the Department would have no jurisdiction. We would recommend against its use for agricultural purposes.

Disposal of hazardous waste must be in conformance with the Health and Safety Code, Division 20, Chapter 6.5, and with Chapter 2 of Division 4, Title 22 of the California Administrative Code.

Harvey F. Collins
Harvey F. Collins, Ph.D.
Acting Chief

Attachments (2)
See attached page for cc's

James A. Walker

-2-

December 7, 1978

cc: Michael Batham
Stephen Ramirez
Chris Oliveira
Wendy Reid
→ Dave Meith
David L. Storm, Berkeley HMMS
RWQCB - North Coast

Memorandum

To : Mr. James A. Walker
Executive Director
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

78-NO 1-7

Date: DEC 6 1978

ENERGY COMMISSION
RECEIVED

DEC 11 1978

From : STATE WATER RESOURCES CONTROL BOARD

Subject: DWR BOTTLE ROCK GEOTHERMAL NOI COMMENTS AND APPLICABLE LAWS

This is in response to your request for the Board's comments regarding the DWR Bottle Rock Geothermal NOI and the request for information regarding applicable laws and standards affecting the project.

Comments on this NOI are as follows:

HYDROLOGY AND WATER SUPPLY, page 11, Treat Excess Condensate -

The proposed condensate treatment facility for the production of usable water suggests that a significant amount of salt and/or brine wastes could be generated during that operation. Therefore, possible storage and ultimate disposal of such wastes should be described.

SOLID WASTE MANAGEMENT, page 1, third paragraph -

It should be noted that holding and/or mud pits must be provided with appropriately designed and constructed artificial liners to preclude exfiltration of wastes. Such liners must be two feet thick and have permeabilities of 1×10^{-6} cm/sec or less or equivalent.

SOLID WASTE MANAGEMENT, page 2, second paragraph -

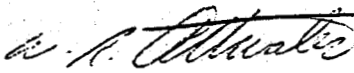
The erosion control plan should be comprehensive, should include a time schedule for implementation, and should provide for long-term maintenance as needed.

WATER QUALITY, page 5, fourth paragraph -

The retention barrier or basin to contain condensate spills must be artificially lined to ensure full containment. Coefficient of permeabilities of 1×10^{-6} cm/sec or less can be attained by properly installing and maintaining asphalt-concrete liners. A two-inch thick liner should be suitable only for containing accidental spills.

The Regional Water Quality Control Board, North Coast Region has provided detailed information relating to the laws, regulations, etc., applicable to the geothermal project in their response to a similar request for information regarding PG&E Geyser Unit 17 (See memorandum to Frank J. Hahn, Deputy Executive Director for David H. Snetsinger, Regional Water Quality Control Board, North Coast Region, dated June 13, 1978). This information should be sufficient for your analysis of the DWR Bottle Rock Geothermal Project.

We are unable at this time to provide comments and recommendations concerning the conformity of the proposed project to the applicable laws, or concerning its design, operation and location, beyond the comments on the NOI. We rely on the Energy Commission's hearing process to develop sufficient information to enable us to make meaningful comments and recommendations.



^{for}
Larry F. Walker
Executive Director,
Water Quality

cc: Larry Pearson
California Regional Water Quality
Control Board, Central Valley Region
3201 S Street
Sacramento, CA 95816

Thomas Bailey
Division of Planning & Research
2125-19th Street
Sacramento, CA 95818

Memorandum

78-NOI-7

Mr. Frank Hahn, Deputy Executive Director
California Energy Commission
1111 Howe Avenue
Sacramento, California 95825

Date : November 30, 1978

L. J. ...

NOV 30 1978

From : Douglas D. Bell, Executive Secretary

Subject: Bottle Rock Notice of Intention (Docket No. 78-NOI-7)

The Board's Property Taxes Department staff has reviewed the Notice of Intention (NOI) from the Department of Water Resources (DWR) for its proposed Bottle Rock Geothermal Power Plant. It is our conclusion that the portion of this project owned by the steam producer (McCulloch Oil Corp., et al.) is subject to taxation, and should be assessed by the Lake County Assessor. The generating facility, owned by DWR, is not subject to taxation.

The NOI is silent on the subject of estimated property tax revenue generated by this project. Our staff estimates that approximately \$180,000 would be generated annually by the taxable portion of this project.

If we can be of further assistance on this matter, please let me know.

Richard F. Adelman
for D.D. Bell

DDB:fb



COUNTY OF LAKE

Air Pollution Control District

Courthouse — 255 N. Forbes Street
Lakeport, California 95453
Telephone 707/253-2391
Laboratory: 707/253-2392
Burn Info.: 707/253-3121

FAYNE L. TUCKER
Air Pollution Control Director

78-NOI-7

November 30, 1978

ENERGY COMMISSION
RECEIVED

DEC 6 1978

Ms. Wendy Reid
Project Manager
Office of Projects Administration
1111 Howe Avenue
Sacramento, California 95825

Dear Ms. Reid,

Enclosed is a copy of the Lake County Air Pollution Control District's comments on the DWR Bottle Rock Notice of Intention. I realize this comes to you much later than the date requested in the original notice of October 31, 1978. Numerous other commitments did not allow me to respond before this date. This response should be coming to you however, within 30 days of our receipt of your request on November 2, 1978.

Many of the District's questions and comments on the NOI are redundant with the "additional data requests" made by the Energy Commission staff. Only those concerns not already addressed will be listed here.

Sincerely,

Steve Zalusky
Acting Director, LCAPCD

SZ/mlh

cc: Shimizu, R.
Stolesen, N.

LAKE COUNTY AIR POLLUTION CONTROL DISTRICT
COMMENTS ON DWR BOTTLEROCK NOTICE OF INTENTION

1. Air Quality Section, Page 9, 2nd paragraph

"Stacking at the plant is a greater source of H₂S emissions than is a well cleanout. There are two possibilities of reducing stacking emissions at a powerplant. Both are based on present technology.

One means of reducing stacking emissions is to interconnect the wells of the generating unit that is down with the steam supply lines of an operating unit."

"Another means is the use of a different type of valve at the well head that allows stacking at a smaller flow rate within a shorter period of time automatically."

COMMENTS:

- A. Is it being suggested here that the Bottlerock Road unit's steam supply field may be crosstied with that of some other powerplant as a means of H₂S abatement during plant shutdown?
- B. If so with what other powerplant is this crosstie to be made?
- C. What percentage of flow reduction will be accomplished through the use of the new automatic V-ball type valves?
- D. In what percentage of H₂S abatement during steam stacking will this result?
- E. Will either of the proposed abatement techniques or some combination thereof be capable of the H₂S abatement necessary to avoid exceeding the state ambient air standard, or making a measurable contribution to an existing violation? The amount of abatement necessary will probably be equal to that required of the powerplant to which the steam transmission line is tied.
- F. If shutting wells in to their normal bleed rate is proposed as a means of H₂S abatement during plant shutdown, for how long and at what percentage of flow will the wells need to be vented to the atmosphere before the plant can be put back into operation?
- G. If steam is to be vented to the atmosphere while bringing the steam supply field back on line, is some form of H₂S abatement being proposed for this operation?

2. Air Quality Section, Page 13, 2nd paragraph

"In an area of limited water supply, this water loss (through evaporation) is generally replenished by using part of the condensate. As the condensate contains dissolved H_2S , this means that a small amount of H_2S would still be transported to the cooling tower where it can escape to the atmosphere.

COMMENT:

In Section V, Page 32, DWR claims that condensate will be treated with H_2O_2 or by some other means if deemed necessary to comply with Air Quality Standards. Is it being implied in the above statement that the condensate used to make up cooling water will be drawn off upstream of the condensate treatment system?

3. Air Quality Section, Page 13, 3rd paragraph

"If the water lost to evaporation can be obtained from some other source, (other than condensate) or if the wet tower could be eliminated, the generating plant would have essentially no H_2S emissions under normal operation. The raw condensate could then be reinjected without any portion of it exposed to the atmosphere.

COMMENT:

Has DWR considered the effect that reinjecting raw condensate may have on increasing H_2S concentrations in the steam supply field? Pacific Gas and Electric Company maintains that reinjected H_2S has this potential.

Section V, Page 23 Cooling Tower

COMMENT:

In order to conduct an air quality impact analysis on the plant, more detailed information will be needed on the cooling tower. Such information should include:

Number of Cells
Stack exit velocity M/sec
Cell Diameter M
Estimated flow of steam thru a cell in M^3/sec at $300^\circ K$ and at normal cooling
Cell pressure mb

Section V, Page 25, Figure V-7

COMMENT:

Power cycle diagram should incorporate a breakdown of mass flow through system in GPM. H_2S abatement system should be included in the cycle

Memorandum

Office of the Secretariat
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

Date: November 30, 1978

File: Environmental General

ENERGY COMMISSION
RECEIVED

78-NOI-7

DEC 5 1978

From: DEPARTMENT OF TRANSPORTATION
Division of Aeronautics

Subject: Notice of Preparation of an Environmental Impact Report (EIR) -
Bottle Rock Power Plant - Department of Water Resources

Our review of the Notice of Preparation indicates four areas of concern to the Division of Aeronautics which we feel should be addressed in the Environmental Impact Report.

I. Transmission Lines and Towers

Hazards to aircraft in flight caused by extending the height of existing transmission towers and/or construction of transmission lines over new routes - Section 21656-21660, Public Utilities Code (Appendix A, attached).

II. Aircraft and/or Airport/Heliport Operations

Use of aircraft during the construction phase of this project would subject the proponent to the provisions of the State Aeronautics Act and/or Department of Transportation Regulations.

The Division of Aeronautics is the approving authority for the issuance of airport/heliport permits within the State. The Division is governed in the issuance of permits by Subchapter 2 and 2.1, Chapter 9, Title 4, State Administrative Code; and Article 3, Chapter 4, State Aeronautics Act.

III. Helipad as Part of Project

If the construction of a permanent helipad is contemplated (i.e., for transmission line inspection, transportation of employees or materials, etc.), it would be better to evaluate it as a part of this project rather than as part of a separate project to be submitted at a later time. The Department standard for heliport design is the Federal Aviation Administration's Advisory Circular 150/5390-1B, Heliport Design Guide, dated August 22, 1977.

November 30, 1978

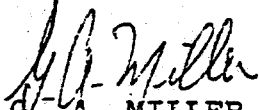
IV. VORTAC Stations

VORTAC stations are the principal means for the navigation of aircraft in flight.

Structures that obstruct a line of sight between the station and the aircraft using the facility may cause the information received by the aircraft to be unreliable. Obstructions must be below an imaginary plane which:

- A. Forms a $+1\frac{1}{2}^{\circ}$ angle with a horizontal plane through the base of the VORTAC station; and
- B. Forms an angle of $+1^{\circ}$ with a horizontal plane passing through the antenna of the VORTAC.

Thank you for the opportunity to comment.



C. A. MILLER, Deputy Chief
Division of Aeronautics

Attachment

APPENDIX A

The following sections from the State Aeronautics Act may relate to this project:

Section 21656

No person shall erect or add to the height of any structure within the boundaries of this state which will result in a structure that extends more than 500 feet above the ground on which such structure rests until a permit therefor has been issued for such purpose by the department. This section is not applicable to the construction of any structure if the Federal Communications Commission is required to approve the height of the structure or if the height of the structure is required to be approved under the Federal Aviation Act of 1958 (Public Law 85-726: 72 Stat. 731).

Section 21657

The department may refuse issuance of a permit under Section 21656 if it determines after notice and hearing held pursuant to this part, that the erection of or addition to a structure would obstruct the airspace overlying the state so as to create an unsafe condition for the flight of aircraft.

Any person aggrieved by the action of the department pursuant to this section may have such action reviewed by the courts in a manner provided by law.

Section 21658

After the effective date of this section, no public utility shall construct any pole, pole line, distribution or transmission tower or tower line, or substation structure in the vicinity of the exterior boundary of an aircraft landing area of any airport open to public use, in such a location with respect to such airport and at such a height as to constitute an obstruction to air navigation as an obstruction is defined in accordance with Part 77 of the Federal Department of Transportation, or any corresponding rules or regulations of the Federal Aviation Agency, unless the Federal Aviation Agency has determined that such pole, line, tower, or structure does not constitute a hazard to air navigation. This section shall not apply to existing poles, lines, towers, or structures or to the repair, replacement, or reconstruction thereof if the original height is not materially exceeded and this section shall not apply unless just compensation shall have first been paid to the public utility by the owner of any such airport for any property or property rights which would be taken or damaged hereby.

Section 21659

After the effective date of this section, no person shall construct any structure or permit any natural growth to grow within one statute mile of the exterior boundary of any airport open to public use at such height as to constitute a hazard to air navigation as a hazard to air navigation is defined in accordance with Part 77 of the Federal Aviation Regulations of the Federal Aviation Administration, Department of Transportation, unless a permit allowing such construction or growth is issued by the department, provided, however, that such permit shall not be required if the Federal Aviation Administration has determined that such construction or growth does not constitute a hazard to air navigation; and provided further, however, that this section shall not apply to a pole, pole line, distribution or transmission tower or tower line, or substation of a public utility. The foregoing exceptions to this section shall continue, however, to be subject to the provisions of Section 21658.

Section 21660

The department may refuse issuance of a permit under Section 21659 if it determines, after notice and hearing held pursuant to this part, that the construction of the structure or growth of the natural growth would constitute a hazard to air navigation or create an unsafe condition for air navigation.

Any person aggrieved by the action of the department pursuant to this section may have such action reviewed by the courts in the manner provided by law.

Memorandum

78 - NOI - 7

p.c. comment

31

To : Ms. Wendy B. Reid
Bottle Rock Powerplant Project Manager
Energy Resources Conservation and
Development Commission
1111 Howe Avenue, Mail Station 39
Sacramento, CA 95825

Date : November 28, 1978

ENERGY COMMISSION
RECEIVED

DEC 6 1978

From : STATE SOLID WASTE MANAGEMENT BOARD

Subject: Adequacy of the Notice of Intention Bottle Rock Powerplant

This memo is to verify verbal comments relayed to you by Mike Argentine of my staff on November 20, 1978. The Board's concerns include the following:

Solid Waste Management

A number of concerns regarding the generation of solid waste are included in this section. In addition, however, we have identified a number of specific points that should be clarified in order for the Notice of Intent (NOI) to be considered adequate.

The section should contain an assessment of the types and quantities of construction waste generated by the project, its significance in comparison to the present waste generation rates in the areas surrounding the candidate sites, and the impact the waste will have on existing local solid waste disposal facilities.

It should also be noted that any significant change in operation of existing disposal sites will require the facilities' operations permit to be amended.

The section indicates that elemental sulfur will be generated from the abatement of H₂S emissions using the stretford process. According to the NOI the elemental sulfur will be disposed of at a Class I or a Class II-1 disposal site.

Because there are only a limited number of Class I or Class II-1 sites available, their use should be restricted to hazardous waste. Therefore, the NOI should indicate the reasons for classifying the elemental sulfur generated from abatement of H₂S emissions as hazardous. If indeed, these sites are needed, they should be identified, and the impact on the sites noted.

The section should also contain an analysis of the quantities of waste generated from H₂S abatement along with the impact of its disposal at local disposal sites.

Page 2

Ms. Wendy B. Reid

November 28, 1978

Finally, consideration should be given to marketing the elemental sulfur recovered by the stretford process. Since elemental sulfur can be used in the production of some fertilizers, merely disposing of it could be a waste of a valuable resource.

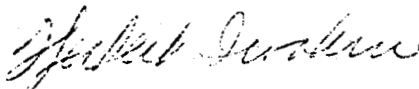
Water Quality

This section gives an overview of the proposed plant's effect on water quality.

It is stated on page 5 of the Water Quality Section that mercury containing sludge will be generated from the cooling tower condensate and that the sludge will be disposed of at a Class II-1 disposal site. However, the amount of sludge that will be collected has not been quantified nor has its impact on the disposal sites been mentioned.

A discussion of the liquid effluents resulting from the stretford process is contained on page 7, of the section. It is stated that some of the effluent will have to be disposed in a Class I or Class II-1 dump site. This discussion should include an analysis of the quantity of waste to be disposed of and its impact on local disposal sites.

If you have any questions regarding these comments please contact Mike Argentine of my staff at (916) 323-0129.



Herbert Iwahiro, Chief
Local Assistance and Planning Division

Memorandum

78-NOI-7

Date: November 27, 1978

File : 01-Lak-175

ENERGY COMMISSION
RECEIVED

DEC 27 1978

From : DEPARTMENT OF TRANSPORTATION -- District 1
P. O. Box 3700, Eureka, CA 95501

Subject: Bottle Rock Geothermal Project
Notice of Preparation

RECEIVED

NOV 29 1978

HEARING OR

The following is in response to the Bottle Rock Geothermal Project Notice of Preparation.

The basic information in the Notice is not sufficient to indicate how access to the site is proposed. We would assume that it will be from Highway 175. This issue should be addressed in the EIR in terms of volume of anticipated traffic in and out of the proposed facility.

DELBERT A. BROWN
Acting District Director

By 

R. J. Brown
Project Studies Engineer

CERTIFIED, RETURN
RECEIPT REQUESTED

Memorandum

To : Mr. Frank Hahn, Deputy Executive Director
Energy Resources Conservation and
Development Commission
1111 Howe Avenue
Sacramento, California 95825

Date: November 20, 1978

ENERGY COMMISSION

NOV 21 1978

From : Department of Fish and Game

Subject: California Department of Water Resources NOI, Bottle Rock Power Plant
(Docket No. 78-NOI-7)

The Department of Fish and Game has reviewed subject report. The project consists of a 55 megawatt geothermal power plant in the High Valley Creek drainage of southwestern Lake County, and a proposed 230 kilovolt transmission line from the plant to one of two locations. Geothermal steam to operate the plant will be provided from 12 wells on an initial two drilling site area developed by McCulloch Oil Corporation. Associated facilities include steam transmission lines and connecting roadways.

Department personnel have inspected the leasehold, the proposed project site, and alternatives. Construction of the unit and the access road will eliminate part of a valuable wildlife habitat, a ponderosa pine — mixed evergreen forest. This area is of significance not only because of the forest vegetation, but also because of its interspersed with a variety of other habitat types in this area. Additional habitat losses will occur with construction of the steam transmission lines connecting to the power plant. We therefore recommend that further consideration be given to locating the unit in the chaparral area adjacent to the existing Francisco well pad. This location will result in disturbance of a more readily mitigable habitat type, will require only a short access road, and will substantially reduce areas needed for steam pipeline construction. In addition, there will be a consolidation of facilities that will reduce disturbance factors associated with human activity on the leasehold. We understand that this area of lower elevation is less preferable because of air quality concerns, that is, there may be less dispersal of air pollutants. In view of the advanced technology that will be installed at the unit to remove H₂S, the major pollutant of concern, we strongly recommend that this area be further considered.

The site plan for the unit, as presented at the field inspection on November 6, appears to utilize an excessive area and will result in the elimination of more habitat than necessary. The major structures are widely separated, the parking lot is oversized for the employees needed, and the cooling tower is twice as large as required for a 55 megawatt unit. We recommend that designs be considered to reduce the area required for the installation.

In addition to further considerations of site selection and plant design, we recommend that a comprehensive mitigation program be implemented to replace wildlife habitat losses. This program should be developed to mitigate for habitat losses from all facilities needed for leasehold production. Such a program should include the following elements:

1. The carrying capacity of wildlife habitat not in the immediate vicinity of the well sites should be increased to replace habitat lost with project construction. This area should be selected such that it will not be subject to impacts of future development. Management to increase wildlife carrying capacity would include:
 - a. Development of watering sites or small ponds in areas of low water availability. If seeps or springs are not available, then a water well should be drilled, a pump installed and maintained, and a pond to retain water should be constructed. At least one such area should be available on a 100-acre parcel.
 - b. Livestock utilization of project lands should be restricted to permit growth of wildlife habitat and forage. The area is not currently grazed, but assurances that this will continue for the life of the project should be provided.
 - c. The habitat and forage value of brush areas should be increased by controlled burning or mechanical crushing and removal. The selected method would depend on the soil type and physical characteristics of the area. Generally, a strip about 100 feet in width and several hundred yards in length on approximately each 25 acres of dense brush would provide increased forage and trail areas.
 - d. Placement of nest boxes for squirrels and songbirds in appropriate habitats where it has been determined that populations may benefit from such development.
2. Cleared areas which are later abandoned because they are no longer needed for project operations should be restored to their former habitat value. This would include scarification of compacted ground, soil preparation, application of fertilizer, immediate seeding with a mixture of grass species, and planting of trees and shrubs of the kind which are found in the area. Such plantings should be watered and tended during their establishment period to ensure survival. Any of the plants which do not survive to maturity should be replaced.
3. Critical wildlife habitats, including deer fawning meadows, den and nest trees, snags, oak stands, riparian growth, waterholes, springs, seeps, and unique associations of mixed plant species should be identified and protected during the course of any future development.

4. Baseline and ongoing monitoring studies should be developed to assess the effectiveness of the mitigation programs.

Specific comments are as follows:

Page V-27. Water supply systems. Water wells could adversely affect spring flows and more information is needed before uses are committed. We request more detailed information be provided since springs are critical to local wildlife.

Page V-36. Transmission lines. Details of the proposed line corridors should be included. We recommend tower placement by helicopter to reduce road construction. Lines should span low vegetation communities and vegetation clearing should be avoided except as necessary to hang lines.

Page VII-3. Applicable laws. Table VIII-1 should include Department of Fish and Game Code Section 1601-03, streambed alteration notification procedures for all stream related activities.

Biological Resources Section

Page 2. Ongoing studies on stream sedimentation mentioned in the report should have a more substantial description with known results presented.

Page 3. Rare and endangered floral areas need at least one full year of analysis.

Page 7. Surface area disturbance is indicated at less than 10%. Substantiation of the figure should be provided.

Page 14-15. Compensation recommendations. These are adequate as general measures but specifics applicable to the leasehold should be presented.

1. Road development near streams should be site specific with a 30 ft minimum buffer area from toe of high bank.
2. The erosion control plan should be site specific.
5. Settling basins should be arranged to catch the northerly drainage and be planted with native vegetation. Outfall of these ponds should flow into the wetland area only at specified water quality standards. Willow, alder and other riparian species should be encouraged.
6. Clearing and grading should be made in a northeasterly direction away from the riparian drainages on the south and west. This includes no disturbance to the chaparral community below the cut line, and pad drainage northerly. Fills should not encroach upon local wetlands. All fill slopes should be adequately prepared to support native vegetation types removed and be replanted. Clearing and grading should not be done during the period October 10 to May 1 and all erosion control measures should be in place prior to October 10 of each year.

8. Existing practices detract from the credibility of this statement. At the time of the field inspection on November 6, McCulloch Geothermal Corporation was grading a well pad drilling site in apparent violation of Condition II.C.7. of the Lake County Use Permit Resolution 75-154, issued January 26, 1976, incorporated by reference in the Lake County use permit for the Coleman site, Francisco Leasehold. Fill from the grading was being deposited in the channel of High Valley Creek and a major tributary in violation of Section 1603, Fish and Game Code.

A final area of concern that should be addressed is the cumulative impacts of this development, including the steam supply fields, and other proposed or potential geothermal operations in this area. We are particularly concerned with the impacts on fish and wildlife resources which may result from the uncoordinated commitment of such a large tract of land to industrial use.

Department of Fish and Game personnel are available to discuss our concerns and recommendations. To arrange a meeting, please contact Mr. E. V. Toffoli, Regional Manager, Region 3, Department of Fish and Game, Post Office Box 47, Yountville, California 94599, telephone (707) 944-2443.

EC J. J. J.

Director

cc: Department of Water Resources

78-NOI-7

Memorandum

To : Office of the Secretariat
California Energy Commission
1111 Howe Avenue
Sacramento, California 95825

Date: November 20, 1978

ENERGY COMMISSION
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NOV 24 1978

NOV 28 1978

From : Department of Fish and Game

HEARING OR

Subject: California Department of Water Resources (DWR) Bottle Rock Geothermal Power Plant Notice of Intention (Docket No. 78-NOI-7) Notice to Public Agencies and Request for Information

The Commission's Notice of November 8, 1978 requested written response to statements concerning our agency's participation in the proceedings pursuant to PRC 25506. This memorandum is to comply with these requests, as follows.

- I. "Identify each aspect of the proposed site and related facility in which your agency has an interest, or for which it has permit authority."

The Department of Fish and Game is concerned with project impacts on fish and wildlife resources. Fish resources may be affected by erosion and stream sedimentation resulting from the clearing, grading, and filling required for the power plant site, steam transmission lines, electrical power transmission facilities, well drilling sites, associated roadways, and other facilities. In addition, large volumes of geothermal steam condensate will be generated. This condensate contains toxic components, and if allowed to discharge into area streams, may have adverse effects on aquatic life. Wildlife resources will be affected by the loss of habitat resulting from clearing, grading, and filling. This habitat loss will be especially severe if critical habitats, such as breeding areas, water sources, foraging areas, or other sites of high value are eliminated. Other losses may occur through reduced wildlife uses of lands adjacent to the facilities because of continuous disturbances associated with development.

- II. "List and summarize the laws, regulations, ordinances, standards, permits, approvals, or other authorizations which are within your agency's jurisdiction or which apply to the Applicant's proposed project."

The Department has broad statutory authority to promote and protect fish and wildlife resources of California. Part of that authority is found in Section 21001 Public Resources Code subdivision (c) in which it is declared to be the policy of the State to "Prevent the elimination of fish and wildlife species due to man's activities, insure that fish and wildlife populations do not drop below self-perpetuating levels, . . .".

In addition, the following sections of the Fish and Game Code are applicable.

Section 900-903; Declares it is the intent of the Legislature to preserve, protect, and enhance the birds, mammals, fish, amphibia, and reptiles of this state, and determination of criteria for rare and endangered species, inventory, and reporting by the Department.

Section 1301; Declares that the preservation, protection and restoration of wildlife within the State is an inseparable part of providing adequate recreation for our people in the interest of the public welfare.

Section 1600; Provides that the protection and conservation of the fish and wildlife resources of the State are of the utmost public interest. Fish and wildlife are the property of the people and provide a major contribution to the economy of the State as well as providing a significant part of the people's food supply and therefore their conservation is a proper responsibility of the State.

Section 1700; Declares that it is the policy of the state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction of the state for the benefit of all citizens.

Section 1750-1756; Native Species Conservation and Enhancement Act; states that it is the policy of this state;

- (1) "To maintain sufficient populations of all species of wildlife and native plants and the habitat necessary to insure their continued existence. . .
- (2) To provide for the beneficial use and enjoyment of wildlife and native plants. . .
- (3) To perpetuate native plants and all species of wildlife for their intrinsic and ecological values, as well as for their direct benefits to man.
- (4) To provide for aesthetic, educational, and nonappropriative uses of the various wildlife and native plant species."

Section 1756 also states that "the policy set forth in this chapter is in the public interest regardless of the economic value or lack of such value of wildlife or native plants."

Section 1801; Declares that it is the policy of the State to encourage the conservation and maintenance of wildlife resources under the jurisdiction and influence of the state. This policy includes the following objectives:

- (a) To maintain sufficient populations of all species of wildlife and the habitat necessary to achieve the objectives stated in subdivisions (b), (c), and (d).
- (b) To provide for the beneficial use and enjoyment of wildlife by all citizens of the state.
- (c) To perpetuate all species of wildlife for their intrinsic and ecological values, as well as for their direct benefits to man.
- (d) To provide for aesthetic, educational, and nonappropriative uses of the various wildlife species.
- (e) To maintain diversified recreational uses of wildlife, including the sport of hunting, as proper uses of certain designated species of wildlife, subject to regulations consistent with the maintenance of healthy, viable wildlife resources, the public safety, and a quality outdoor experience.
- (f) To provide for economic contributions to the citizens of the state, through the recognition that wildlife is a renewable resource of the land by which economic return can accrue to the citizens of the state, individually and collectively, through regulated management. Such management shall be consistent with the maintenance of healthy and thriving wildlife resources and the public ownership status of the wildlife resources.

Section 1900-1913; Native Plant Protection; declares that the intent of the Legislature and the purpose of this chapter is to preserve, protect, and enhance endangered or rare native plants of this state.

Section 2014; Declares that it is the policy of this State to conserve its natural resources and to prevent the willful or negligent destruction of birds, mammals, fish or amphibian, and further provides that the State may recover damages in a civil action against any person who unlawfully or negligently takes or destroys such resources.

Section 2050-2055; Expresses legislative concern over California's threatened wildlife; defines rare and endangered wildlife and gives authority to the Fish and Game Commission to deem what species in California are rare and endangered.

Section 5650; Prohibits discharge into State waters of any substance or material deleterious to fish, plant life, or bird life.

Sections 3511, 3505, 4700, 5000, 5050, and 5515; Regarding fully protected fish and wildlife species.

- III. "Describe the nature and scope of the informational requirements which the Applicant must eventually meet in order to satisfy the concerns or permit requirements of your agency; summarize your agency's procedures for resolution of such concerns or requirements and indicate the amount of time necessary to do so; describe any other studies, analyses, or other data collection which the Applicant, your agency, or the Energy Commission would have to perform in order to resolve pertinent concerns or permit requirements of your agency."

Studies should be developed to assess fish and wildlife populations and habitat within the leasehold and adjacent areas. These studies should be conducted for a period of at least five years to establish baseline conditions, and should be repeated following development to assess impacts and the effectiveness of mitigation measures.

Areas of potential habitat for rare and endangered plant species should be surveyed at least quarterly for one year to document the presence or absence of such species.

- IV. "Conduct a preliminary analysis, based upon present information for the purpose of providing comments and recommendations to the Commission regarding the design, operation, and location of the facilities designated in the NOI, in relation to environmental quality, public health and safety, and other factors on which your agency possesses expertise. For purposes of compliance with this NOTICE AND REQUEST FOR INFORMATION, the preliminary analyses should be limited to identifying any aspects of the proposed site and facilities which are likely to substantially affect the conformity of the site and related facility with applicable state, regional, and local laws and regulations. The Commission does not request or expect agencies to perform, for purposes of this NOTICE AND REQUEST FOR INFORMATION, complete analysis sufficient to resolve all agency concerns or to satisfy all requirements for an ultimate permit."

The Department of Fish and Game participated in an inspection of the proposed site and adjacent areas on November 6, 1978. The project consists of a 55 megawatt geothermal power plant in the High Valley Creek drainage of southwestern Lake County, and a proposed 230 kilovolt transmission line from the plant to one of two locations. Geothermal steam to operate the plant will be provided from 12 wells on an initial two drilling site area developed by McCulloch Oil Corporation. Associated facilities include steam transmission lines and connecting roadways.

Construction of the unit and the access road on the selected site will eliminate part of a valuable wildlife habitat, a ponderosa pine-mixed

evergreen forest. This area is of significance not only because of the forest vegetation, but also because of its interspersion with a variety of other habitat types in this area. Additional habitat losses will occur with construction of the steam transmission lines connecting to the power plant. The area adjacent to the existing Francisco well is chaparral, for which mitigation can be more readily developed. Location of the plant here would require less road and steam pipeline construction, and therefore this would be a more suitable site in terms of fish and wildlife preservation.

The meadow area located between the two steam supply well sites is also an important habitat type. At the time of the field inspection, we were informed that it becomes a seasonal wetland during the winter rainfall period. Accordingly, this area should be protected from any alteration as specified in the "Wetlands Policy for Proposed Construction Projects" issued by the California Secretary for Resources, September 19, 1977.

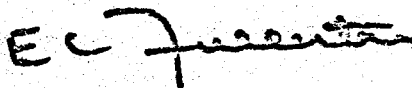
V. "Identify mitigation or modifications, if any, to the proposed project required to achieve conformity."

1. The project should be modified to locate the power plant adjacent to the existing Francisco well site. Mitigation can more readily be developed for the loss of wildlife habitat here than the proposed site, and will require less habitat loss from road and steam transmission line construction. In addition, there will be a consolidation of facilities that will reduce disturbance factors associated with human activity on the leasehold.
2. The electrical transmission corridor, steam transmission lines, access roads, and any other proposed facilities should be surveyed for critical wildlife habitats or rare or endangered plants.
3. A berm should be placed around the plant site to contain up the maximum amount of condensate that may be spilled from the cooling tower basin.
4. The steam condensate sedimentation pond should be sized to retain any potential overflow of condensate.
5. The condensate injection line should be constructed of material which is not likely to corrode or rupture and should be located so as to disturb the minimum possible habitat, should avoid hazardous areas, such as steep slopes, landslides, or areas of vehicle operation, and should contain automatic shut-off valves to prevent spills in event of breakages.
6. Sedimentation basins should be placed in tributaries directly below cut or fill slopes. Collected sediment should be removed periodically. The basins should have impermeable clay linings so as to retain water for wildlife during summer months.

7. Roads intended for all-weather travel should be compacted, paved, and drainage systems installed to prevent erosion. Road drainage systems should be designed to eliminate discharges of runoff into erodible areas.
8. Those areas altered by construction activity, but not needed for operation of the facilities, such as cut or fill slopes, should be restored to their former wildlife habitat value. This would require soil preparation, application of fertilizer, immediate seeding with appropriate quantity and mixture of grass and herb species, and planting of trees and shrubs of the kind which are found in the area. Such plantings should be watered and tended during their establishment period to ensure survival. Any of the trees or shrubs which do not survive to maturity should be replaced.
9. The carrying capacity of wildlife habitat not in the immediate vicinity of the well sites should be increased to replace habitat lost with project construction. This area should be selected such that it will not be subject to impacts of future development. Management to increase wildlife carrying capacity would continue for the life of the project and would include:
 - a. Development of watering sites or small ponds in areas of low water availability. If seeps or springs are not available, then a water well should be drilled, a pump installed and maintained, and a pond to retain water should be constructed. At least one such site should be available on a 100 acre parcel.
 - b. The habitat and forage value of brush areas should be increased by controlled burning or mechanical crushing and removal. The selected method would depend on the soil type and physical characteristics of the area. Generally, a strip about 100 feet in width and several hundred yards in length on approximately each 25 acres of dense brush would provide increased forage and trail access.
 - c. Livestock utilization of project lands should be restricted to permit continued growth of wildlife habitat and forage. The area is not currently grazed, but assurances that this will continue for the life of the project should be provided.
 - d. Placement of nest boxes for squirrels and songbirds in appropriate habitats where it has been determined that populations may benefit from such development.

10. Cleared areas which are later abandoned because they are no longer needed for project operations should be restored to their former habitat value. This would include scarification of compacted ground, soil preparation, application of fertilizer, immediate seeding with an appropriate quantity and mixture of grass species, and planting of trees and shrubs of the kind which are found in the area. Such plantings should be watered and tended during their establishment period to ensure survival. Any of the trees or shrubs which do not survive to maturity should be replaced.

Department of Fish and Game personnel are available to discuss our comments and recommendations. To arrange a meeting, please contact Mr. E. V. Toffoli, Regional Manager, Region 3, Department of Fish and Game, Post Office Box 47, Yountville, California 94599, telephone (707) 944-2443.



Director

cc: Department of Water Resources

pa 12-7-68-23



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
2800 Cottage Way, Rm. E-2727
Sacramento, California 95825

78-NOI-7

November 16, 1978

ENERGY COMMISSION
RECEIVED

NOV 22 1978

Mr. Frank Hahn, Deputy Executive Director
California Energy Commission
1111 Howe Avenue
Sacramento, California 95825

Dear Mr. Hahn:

Your October 31 letter requested our review and comments concerning the California Department of Water Resources' Notice of Intent (NOI) application for its proposed Bottle Rock Project (a 55-megawatt geothermal power plant), Lake County, California. We have reviewed the application and offer the following comments.

General Comments

With the exceptions listed under Specific Comments, the NOI adequately describes the existing fish and wildlife resources and a number of impacts which would result from project construction and operation. However, the NOI does not address two major issues associated with geothermal activities. They are:

1. A discussion of the cumulative effects of this project in relation to existing and proposed geothermal projects is needed. Pacific Gas and Electric currently operates 13 powerplants and has plans for another 12 or more in The Geysers. In addition, there are a number of nearby leaseholds undergoing various stages of geothermal development. The continuing encroachment of geothermal projects will have long-term adverse impacts on fish and wildlife resources and their habitats. While the loss of fish and wildlife habitat attributable to the Bottle Rock Project may appear minor, collectively a number of geothermal projects in the area would have significant impacts.

Throughout the NOI, the loss of wildlife habitat is minimized. Nevertheless, the commitment to develop a leasehold (acreage not listed in the NOI), i.e., full-field development, would convert a forested watershed into an industrial complex. This action would result in long-term adverse impacts on fish and wildlife resources through the reduction and impairment of habitat. According to the



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State Geothermal Task Force 1977 Report ^{1/}, each geothermal plant and related facilities utilizes 700 to 1,000 acres of land.

2. While the proposed compensation measures, if implemented, may minimize several adverse impacts, we are not convinced that those measures (Section VII Environmental Effects-Biological Resources pp. 14-15) would adequately compensate for the loss of resource habitat caused by project construction and operation. The extensive land disturbances associated with the construction of geothermal facilities such as roads, pipelines, sumps, power plant, and transmission lines results in the permanent loss of wildlife habitat. In the operation of geothermal facilities, accidental discharges of toxic materials sometimes occur and this causes the loss of fish and wildlife resources and habitat. Increased human activities on the leasehold could be detrimental to wildlife, particularly during breeding or nesting and rearing periods. We maintain that the loss of resources and habitat extends throughout the entire leasehold and is not restricted to 5-15 acres (listed on pp. 24-25, Biological Resource). There are short-term and long-term impacts on the carrying capacity of lands supporting fish and wildlife populations associated with this project in combination with adjacent projects. The effects of piecemeal development and continued encroachment by geothermal activities has diminished and will continue to diminish the value of resource habitat needed to maintain wildlife resources. The loss of resource habitat could be adequately compensated by the acquisition and development of replacement lands adjacent to or farther removed from the Francisco leasehold. This is a common practice with water development projects where the the construction agency, such as the Corps of Engineers, will acquire and develop lands for wildlife management purposes to compensate for resource losses, just as residential and industrial properties, bridges, roads, and railroad tracks are replaced at project cost.

Specific Comments

1. Page IV-9, paragraph 3. We disagree with the view that geothermal activity in the undeveloped lease area would have an insignificant effect on hunting and grazing. The imposition of an industrial complex on a forested watershed would reduce the available land base (wildlife habitat) and restrictive regulations would decrease hunting opportunities. "No Hunting" and "No Trespassing" signs are already conspicuous in The Geysers area.

Because fish and wildlife resources provide the public with significant economic, recreation, esthetic, and social benefits, the value of these resources is not limited to anglers and hunters but is shared by bird watchers, photographers, students, sightseers, and other members of society. Hunting has significant economic and recreation value. For example, a survey of the economic value of deer hunting in nearby Mendocino County revealed expenditures by deer hunters exceeded \$1.5 million annually. ^{2/} These figures are supported by the

1975 National Survey of Hunting, Fishing, and Wildlife-associated Recreation^{3/}, which showed that nearly 96 million Americans participated in one of these activities. Approximately 20.6 million Americans hunted in 1975 and spent an average of \$12.20 per day on hunting. Of this total, 13 million hunters spent over 2-1/2 billion dollars in their pursuit of big-game species. According to the California Department of Fish and Game^{4/}, there were 337,400 licensed hunters in 1977 who spent an average of 7.5 days hunting deer in California. Using these figures in combination with those of the 1975 National Survey, it is estimated that deer hunters contribute \$31 million annually to the state and local economy.

2. Page V-6, Figure V-4. Alternative Powerplant Sites. If the sites in Figure V-4 were numbered, the text concerning each site would be more understandable. The reader is left wondering where Sites 4,5,6,9, and 10 are located in Figure V-4.
3. Page V-15, Figure V-6 is blank as is the Plot Plan on the same page.
4. Page V-43. The Department of Water Resources anticipates having a total of three geothermal powerplants in The Geysers area. Additional information should be provided in the NOI listing tentative location, size of the powerplant, and possible date for initial operation. This information would provide other agencies, planners, and the public with a view of the overall long-range geothermal development plan for The Geysers region.
5. Pages 11-14, Section VII Environmental Effects - Biological Resources. There is a need to conduct field studies to find answers that will offset the impacts of geothermal activities on fish and wildlife resources and habitat. A number of studies were suggested in the text, and we agree that they are necessary and should be implemented.

Summary Comments

Because the NOI application reflects concern for the protection of natural resources and the environment, the project offers an opportunity to demonstrate that the development of geothermal resources may coexist with other resources and uses valued by the public. We are not opposed to the project as an energy source provided fish and wildlife resources are adequately protected. Our position is that the protection of fish and wildlife resources is part of the cost of developing any project. This position is based on Congressional mandates set forth in the Fish and Wildlife Coordination Act, the National Environmental Policy Act, the Endangered Species Act, and similar legislation.

In conclusion, we recommend that:

1. Fish and wildlife habitat degraded or destroyed as a result of geothermal activities be compensated for through the acquisition and development of habitat adjacent to or farther removed from the Francisco Leasehold.
2. Funds be made available to conduct fish and wildlife studies as well as related environmental studies (as listed in the NOI application) prior to the initiation of extensive geothermal activities on the Francisco Leasehold.

We hope the preceding comments and recommendations will assist you in the evaluation of the proposed project. Thank you for the opportunity to review and comment on the NOI.

Sincerely,

James J. McKeivitt
for James J. McKeivitt
Field Supervisor

Attachment: References cited

cc: Dir., CDF&G, Sacramento
Reg. Mgr., CDF&G, Reg. III, Yountville

References Cited

1. Grew, P.G. 1977. Draft Report of the State Geothermal Task Force: Executive Summary and REcommendations. Sacramento, CA. The Resources Agency. 24 pp.
2. Connolly, G.E. 1966. Deer hunters and deer management-an opinion survey in Mendocino County. Unpublished MS. Filed at Hopland Field Station, Hopland, CA.
3. U.S. Department of the Interior, Fish and Wildlife Service. 1977. (The) 1975 National Survey of Hunting, Fishing, and Wildlife-Associated Recreation. Washington, D.C. Fish and Wildlife Service. 100 pp.
4. California Department of Fish and Game. 1978. Report of the 1977 Game Take Hunter Survey. Sacramento, CA. The Resources Agency. 17 pp.

APPENDIX D

Following are the responses of first, the Applicant, and then the Commission Staff to the concerns raised in the public agency comments contained in APPENDIX C.

Memorandum

78-NOI-7

To : Pam Patterson
Office of the Secretariat
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

Date : February 21, 1979

File No.: Bottle Rock NOI
78-NOI-7ENERGY COMMISSION
RECEIVED

Subject :

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1979

From : Department of Water Resources

HEARING OR

The Department of Water Resources (Department) was requested in the Bottle Rock Notice of Intention Hearing Order of January 12, 1979, to respond to all State Agency comments received in the Bottle Rock Project. The purpose of the memorandum is to respond to those comments which were submitted by the following State Agencies: the Solid Waste Management Board; the Department of Transportation; the Department of Fish and Game; and, the Department of Health.

Solid Waste Management Board

Memorandum of November 28, 1978 (Comments)

Memorandum of December 13, 1978 (Position Paper)

In the area of Solid Waste Management, the Department provided responses to the CEC's Addition Data Requests on November 17, 1978. At the November 20, 1978, workshop, this area was discussed by Department staff, CEC staff and a representative from the Solid Waste Management Board. Issues were raised and information was exchanged to the satisfaction of all participants.

In the Prehearing Conference Workshops, the concerns of the Solid Waste Management Board were discussed and included as appropriate into the Joint Prehearing Conference Statement. These concerns addressed the quantities and disposal procedures or sale of solid waste produced during the construction and operation phases of the project and their associated impacts. With the commitments and assurances listed in the Joint Prehearing Conference Statement, the Department feels that all issues raised by the Solid Waste Management Board's comments have been fully addressed.

Department of Transportation--District 1

Memorandum of November 27, 1978 (Access)

As noted in the January 9, 1979, Prehearing Conference, site access is discussed on pages V-13, 14 of the Notice of Intention.

Pam Patterson
Page 2
February 21, 1979

This discussion includes information about eastern, western and southern approaches to the power plant site.

Memorandum of November 30, 1978 (Aeronautics)

The following responses correspond to individual issues raised in the November 30, 1978, memorandum:

- I. The construction of transmission lines and towers will not be hazardous to aircraft in flight as they will be in a remote locality and under 150 feet in height.
- II. If aircraft is used in construction, it will be subject to the appropriate laws and regulations.
- III. No permanent helipad is contemplated.
- IV. Construction of Bottle Rock Powerplant and related facilities will not impact VORTAC stations by either criterion stated in the memorandum.

In summary, there should be no impacts to aeronautics as a result of the Bottle Rock Project.

Department of Fish and Game

Memorandum of November 20, 1978 (to Mr. Frank Hahn)

Memorandum of November 20, 1978 (to Office of the Secretariat)

In the weeks that have transpired since these memoranda were transmitted, the Department of Water Resources (DWR) has spent a significant amount of time with the Department of Fish and Game (DFG) identifying and resolving their concerns. DWR has also received a Memorandum from DFG dated January 16, 1979, which demonstrates the level of understanding between the two Departments. This letter was attached to Written Testimony of J. Gary Steenhoek and was submitted to the CEC on January 18, 1979.

As stated in the Biological Resources section of the Joint Prehearing Conference, DWR will work with DFG to develop a detailed mitigation plan which will be submitted to the CEC by the filing of the Bottle Rock AFC. This document should resolve all issues which DFG raised in its November 20, 1979, memorandum.

Pam Patterson
Page 3
February 21, 1979

Department of Health

Memorandum of December 7, 1978 (Hazardous Materials)

The Department is planning to market the sulfur cake. If this is not possible, it will be disposed with other hazardous wastes at either a Class I or Class II-1 site.

Disposal of hazardous waste will be in conformance with the appropriate chapters of the Health and Safety Code and California Administrative Code.

Memorandum of January 12, 1979 (Radiological Monitoring)

Section 25607 of the Health and Safety Code

"No person shall operate a nuclear reactor, nuclear fuel reprocessing plant, or other installation, as defined by the Department, which could, as a result of routine operations, accident, or negligence, significantly contaminate the environment with radioactive material, without first instituting and maintaining an adequate program of radiological monitoring. The proposed program shall be submitted to the Department for review and acceptance as to its adequacy."

In the Department of Health's January 12, 1979, memorandum it is stated that the Environmental Health Branch generally concurs that operation of 11 electrical generating units does not currently add a significant increment of radioactivity to the environment of The Geysers area. Since these 11 units total 502 MW, it is unforeseeable how Bottle Rock Powerplant's 55 MW could significantly contaminate the environment with radioactive material.

The Department of Health has not clearly defined if and/or why the Department of Water Resources' Bottle Rock Powerplant could be considered a source for potential radioactive contamination. In the Joint Prehearing Statement, the Department of Water Resources agreed to initiate a radiological monitoring program, if necessary. At the time of the Prehearing Conference, the Department of Water Resources was unclear what monitoring would

Pam Patterson
Page 4
February 21, 1979

would be required. The attached letter from J. O. Ward, Chief of the Radiological Health Section, provides clarification to what was meant by "monitoring".

Should the CEC have any questions, please do not hesitate to contact Judy Warburg, Project Manager, or Alan Hockenson, Assistant Project Manager for the Bottle Rock Powerplant Notice of Intention at 8-492-2843.

E. J. Terhaar
E. J. Terhaar, Chief
Energy Division
8-485-6687

Attachment

Memorandum

To : Lloyd Harvego, Deputy Chief
Energy Division
Department of Water Resources
1416 Ninth Street, Room 452-59

Date : February 13, 1979

Subject: Bottle Rock Power Plant

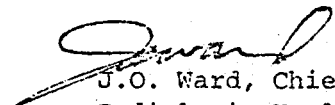
Telephone: ATSS ()
() 2-2073

From : Public and Environmental Health Division
555 Capitol Mall, Room 1455

This is to let you know roughly what we mean by appropriate monitoring in amplification of our comments on January 12, 1979, to the Energy Commission.

In discussion with Irv Goldberg, it has been concluded that what will be needed is a sample of the non-condensable gases from the turbine exhaust taken in such a way as to reflect the radon concentration in the mixed steam from the several wells. At the outset, this sampling should be done quarterly; the interval might be expected to be cut back to annually once the nature of the off gases of the wells are characterized and clear data on their periodic variations are available.

There are several laboratories that could make such analyses. If you want information on these, please call.


J.O. Ward, Chief
Radiologic Health Section

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
<p>Calif. Dept. of Health Services (DOHS)</p> <p>January 12, 1979</p>	<p>DOHS is concerned that future development at the Geysers may triple the amount of radioactivity released to the environment at the Geysers. DOHS believes that DWR should provide a commitment to program for periodic monitoring and reporting of radioactive emissions from Bottle Rock. DOHS recommended that DWR submit a plan for monitoring and reporting to them for their review and approval.</p>	<p>Staff recommends that DWR to required to provide details of a monitoring program for radioactive emissions from the Bottle Rock power plant to the CEC and DOHS at or prior to filing an AFC for this project.</p> <p>Source: Public Health Finding and Conclusions and Staff Position Paper</p>
<p>Lake County Air Pollution Control District (LCAPCD)</p> <p>November 30, 1978</p>	<p>The LCAPCD has provided comments on the Air Quality Section of the Bottle Rock NOI. The following concerns are expressed in the letter from the APCO dated November 30, 1978.</p> <ol style="list-style-type: none"> 1. Details on the abatement technology and systems to applicant's steam supplier (McCullough intends to use to abate H₂S emissions). 2. Is the condensate used to make up cooling water to be drawn off upstream of the condensate treatment system. 3. <ol style="list-style-type: none"> a. Has DWR considered the effect of reinjecting raw condensate. b. Detailed information should be supplied on the cooling tower design and the H₂S abatement system. 	<ol style="list-style-type: none"> 1. The Applicant's steam supplier (McCullough), per an earlier agreement with the Lake County APCD, is to study and develop an evaluation report on steam transmission line abatement system. The study/report is estimated to take several months to complete. However, as agreed to by the Applicant and steam supplier at the Pre-Hearing Conference of January 9, 1979, the system(s) to be used to comply with the Lake County APCD's regulations for this project will be designated at or prior to filing an AFC. Staff concurs with this conclusion <p>Source: Air Quality Findings and Conclusions</p> <ol style="list-style-type: none"> 2. This comment should be responded to in the AFC filing as it is a design concern. Staff will review it at that time.

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
Lake County Air Pollution Control District		<p>Union Oil Company, a major steam supplier in The Geysers, and requested an opinion of Union's analysis of this potential problem. Based on limited studies, Union currently is unable to establish a potential problem (i.e., H₂S increases) from condensate reinjection. They will continue their monitoring of the wells and will assist staff as requests are made. Staff concludes that present knowledge of reinjection indicates no problem with the field and no correlation of H₂S increases.</p> <p>3. b. The detailed-final design should be submitted with the AFC filing. Staff will review the final design at the AFC stage of this proposal.</p>
Dept. of Fish & Game 2 memos to: Office of the Secretariat Frank Hahn November 20, 1978	<p>The Department's 2 memos were very similar. They have been combined for the purposes of this summary. The primary concern revolves around the loss of Ponderosa mixed-evergreen forest (a valuable wild life habitat) at the proposed site. To prevent this loss the department has proposed an alternative site located in a chaparral habitat. The Department also expressed concern regarding the coordination of this project and future projects, mitigation measures and the size of the site to be developed.</p>	<p>The Staff believes that the development of the proposed site with adequate mitigation measures will not result in an unacceptable loss of habitat. Further staff believes that other technical areas must be included in any consideration of an alternative site.</p> <p>With regard to coordinating this project with future projects the Joint Finding & Conclusions and the DFG have recognized</p>

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
<p>Dept. of Fish & Game</p>		<p>the need for and further recommends that a generic workshop be held on cumulative biological impacts.</p> <p>Staff believes that the mitigation package developed by DFG and the Applicant will adequately address DFG's concern in this area.</p> <p>Finally Staff recommends that the site size be kept to a minimum thus resulting in the least environmental degradation. Staff will review the final design at the AFC filing.</p> <p>Source: Staff Responses to Biological Resources Concerns</p>
<p>Northern Sonoma County Air Pollution Control District December 18, 1978</p>	<p>On December 18, 1978 NSCAPCD filed a brief of six (6) general concerns (listed below) for all geothermal projects under the jurisdiction of the NSCAPCD. Staff has reviewed these concerns and has made comments on their applicability to the DWR/Bottlerock project. However, it should be noted that the DWR/Bottlerock project and steam field are located entirely within the jurisdiction of Lake Co. APCD and would preclude any enforcement of the NSCAPCD concerns.</p> <p>Specific Concerns:</p> <ol style="list-style-type: none"> 1. BACT should mean the ability to achieve 8gm/GMW-Hour or 99% level of abatement. 2. Each project air analysis should consider drain- 	<p>Concern #1 - Staff is conducting workshops with other regulatory, agencies, utilities and private parties to develop a BACT system.</p> <p>Concern #2 - Designates the assumed worst case meteorological scenarios for a geothermal facility in the Geysers area. Presently, all projects before the Commission inclusive of DWR/Bottlerock, are being analyzed for projected ambient air quality impacts using these meteorological conditions.</p> <p>Concern #3 - Speaks to the Stretford</p>

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
<p>Northern Sonoma County Air Pollution Control District</p>	<p>age conditions, limited vertical mixing and down-wash conditions. If a study is warranted, then it should have District approval for overall design objectives.</p> <ol style="list-style-type: none"> 3. Effectiveness of Stretford scheme and "partitioning of non-condensables" is not important as long as secondary H₂O₂ abatement is available. 4. Utilities should consider <u>dual</u> units until a satisfactory control system is found for steam transmission line stackings. 5. The Utility must improve its operational procedures <u>toward shut down warning devices, and curtailment rather than shut down and level of manpower to prevent extended shut downs.</u> 6. The steam transmission line is within the jurisdiction of the APCD unless the utility becomes responsible for "stacking" during shut down. 	<p>abatement systems plus condensate treatment and will be addressed in the BACT workshops.</p> <p>Concern #4 - Some geothermal proponents have indicated they will use the <u>dual</u> unit system while others such as in the DWR/Bottlerock project have decided not to expend the necessary additional capital, following a cost-benefit analysis. Staff will continue to study this approach in the AFC proceedings.</p> <p>Concern #5 - Staff has addressed this concern in earlier NOI proceeding and has requested applicants to present, during the AFC proceedings, formalized programs and procedures for operating units during routine maintenance and breakdowns.</p> <p>Concern #6 - Staff attempted to complete any APCD requirements of the steam supplier within the NOI/AFC proceedings. As agreed to by project applicants to date, most issues and concerns of steam transmission lines, line-abatement systems and potential ambient air quality impacts will be addressed at or prior to filing an AFC for the project. DWR/Bottlerock has agreed to a similar request at the January 9, 1979 NOI Pre-Hearing Conference.</p>

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
Northern Sonoma County Air Pollution Control District		<p>In summary, it is the Staff's belief that the concerns of NSCAPCD have been adequately addressed in Staff's interrogatories and the Commission's NOI/AFC.</p> <p>Source: Air Quality Findings & Conclusions; Staff Position Papers and DWR Position Paper; other NOI proceedings.</p>

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
<p>U.S. Fish and Wildlife</p>	<p>The Service identified the following concerns regarding the NOI:</p> <ol style="list-style-type: none"> 1. A discussion of the cumulative effects of this project in relation to existing and proposed geothermal projects is needed. Future geothermal activities should be coordinated to minimize the impact on Biological Resources 2. They service is not convinced that the compensation measures proposed will adequately mitigate losses resulting from the construction and operation activities associated with a geothermal facility. 3. Disagree that geothermal activity would have an insignificant effect on hunting and grazing. The service further indicates that imposition of an industrial complex would impact the wildlife habitat and potentially would reduce the public access to wildlife resource use. 4. Recommend that funds be made available to conduct fish and wildlife studies suggested in the NOI. 	<ol style="list-style-type: none"> 1. In the Joint Findings and Conclusions in the Biological Resources area Staff recognizes the need to consider the cumulative impacts and further recommends that the Commission held generic proceedings to identify cumulative impacts and appropriate mitigation measures. (Finding 24) 2. Staff anticipates that adequate mitigation measures will be developed between DWR and DFG which will adequately address these concerns. However Staff will review the mitigation package during the AFC to determine acceptability in the Biological Resources area. 3. 4. <p>Source: Response to Biological Resources Concerns of the Department of Fish and Game and Fish and Game comments at the evidentiary hearing.</p>

Agency and Date of Comment	Nature of Concern	Staff Response
State Water Resources Control Board (SWRCB) December 6, 1978	<p>The SWRCB expressed the following concerns by Memo dated December 6, 1978.</p> <ol style="list-style-type: none"> 1. The storage and ultimate disposal of potential toxic wastes generated by the water treatment operation described on page 11 of the hydrology and water supply section of the NOI. 2. The mud pits in the well field be constructed to prevent their contents from polluting waters of the state. 3. The proposed erosion plan be comprehensive, include a time schedule for implementation, and provide for long term maintenance. 4. The retention barrier or basin to contain condensate spills must be artificially lined to ensure full containment. 5. It is necessary that this project be reviewed to determine compliance with all applicable water quality laws, regulations, and ordinances. This is addressed in the Water Quality Position Paper. 	<ol style="list-style-type: none"> 1. The CEC staff shares this concern and will require any such waste to be disposed of at an appropriately licensed disposal site unless it is proven to be non-toxic. 2. Although the staff shares this concern, since the well field is not within our jurisdiction, nothing can be done about it by the CEC. It will be included in the EIR for this project. An additional concern was that holding ponds on the facility also be adequately constructed. The Water Quality Position Paper also makes this recommendation. 3. The erosion plan for this project are reviewed in the staff's Position Papers on soils. The staff doing water quality analyses share the concern that the erosion plan be implemented as soon as possible and protect existing water quality. 4. The spill containment facility must be lined to ensure that the spill will be contained on-site and not allowed to leach into waters of the state. This concern is addressed in the Water Quality Position Paper. 5. Staff believe that there is a substantial likelihood that all applicable water quality laws, regulations and ordinances will be complied with.

Source: Water Quality, Soils & Solid Waste Findings and Conclusions and Position Papers.

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
<p>Calif. Board of Equalization November 30, 1978</p>	<p>The Board estimated the Lake County will accure approximately \$180,000 annually from the development of the Bottle Rock Power Plant. Additionally they stated that the generating facility, owned by DWR, is not subject to taxation.</p>	<p>This annual tax revenue is based on the estimated value of improvements only. It does not include the tax on the value of the land owned by the steam producer. Additionally, DWR has submitted in a memo dated January 15, 1979 an estimate of annual tax revenues calculated by the Lake County Tax Assessors Office of approximately \$260,000. This is considered a low end estimate as this includes only the value of the steam only, excluding all improvements.</p>
<p>Dept. of Health Services (DOHS) - Hazardout Materials Management Section December 7, 1978</p>	<p>The DOHS expressed concern that the Stretford solution purge stream is a hazardous waste.</p>	<p>Staff agrees that the sulfur produced by Stretford process is hazardous both in liquid and cake form. Therefore, we recommend its disposal at appropriate waste disposal site. We also assume that the sludge from the cooling tower condensate is hazardous, unless it is proven otherwise, and must be disposed of accordingly</p> <p>Source: Civil Engineering/Solid Waste Management Position Paper.</p>
<p>Solid Waste Management Board (SSWMB) Two Memos expressing similar concerns November 25, 1978 December 13, 1978</p>	<p>The (SSWMB) states that the NOI should include the following information to be adequate in the area of Solid Waste Management:</p> <ol style="list-style-type: none"> 1. The quantity and the impact of waste produced during construction of Bottle Rock power plant on local solid waste disposal facilities, need to be identified. 2. An analysis of the quantities of waste resulting from the H₂S abatement system (the purge 	<p>Staff recommends that DWR submit the information requested to the CEC and SSWMB at or prior to the filing of the AFC for this project.</p> <p>Staff believes it appropriate to discuss the impact on waste disposal facilities in the EIR process.</p> <p>Source: Civil Engineering/Solid Waste Management Position Paper.</p>

DWR - Public Agency Comments

Agency and Date of Comment	Nature of Concern	Staff Response
Solid Waste Management Board (SWMB)	<p>stream and elemental sulfure)the impact of it's disposal at local disposal sites and resources recovery potentials should be provided.</p> <p>3. An analysis of any hazardous waste generated, including quantities, along with the impacts of their disposal on the Class I or II-1 waste disposal facilities, should be provided.</p>	

NOTICE OF PREPARATION

The State EIR guidelines require that a Lead Agency (the CEC) by means of a Notice of Preparation (NOP) notify Responsible Agencies that the Lead Agency plans to prepare an EIR for a project.

<p>Caltrans - District 1, Eureka November 27, 1978</p>	<p>Stated that the EIR should consider increased traffic volume resulting from the proposed project.</p>	<p>The Environmental and Health Office will examine the above issues and they will be included in the EIR where applicable and discussed to the extent necessary.</p>
<p>Dept. of Health Services Hazardous Materials November 20, 1978</p>	<p>Stated that EIR should discuss disposal of solution purge stream and chemical concentrations.</p>	
<p>Caltrans, Division of Aeronautics November 30, 1978</p>	<ol style="list-style-type: none"> 1. Hazard to aircrafts in flight due to transmission lines and towers. 2. Aircraft/Airport/Helicopter Operations during construction are subject to Division of Aeronautics regulations and permits may be required. 3. Consideration of any helipad that may be constructed as part of the project. 4. Structural interference with line of sight navigation systems (Vortec) 	

APPENDIX E

Following are the responses of the Applicant and Commission Staff to the Biological Resources concerns voiced by the Department of Fish and Game at the January 9, 1979 Prehearing Conference.

Memorandum

78-NOI-7

Date : January 16, 1979

File No.:

Subject: Bottle Rock Power-
plant, 78-NOI-7

To : Pam Patterson
Office of the Secretariat
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

ENERGY COMMISSION
RECEIVED

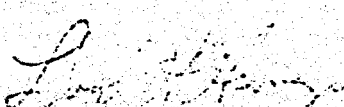
JAN 16 1979

From : Department of Water Resources

At the January 9, 1979 Prehearing Conference in Lakeport, a representative of the California Department of Fish and Game expressed concerns regarding the location of the Bottle Rock Powerplant and whether that power plant would in any way interconnect with a future power plant which may be built on the Bureau of Land Management (BLM) leasehold recently obtained by the Department.

The Department of Water Resources has been working with the Department of Fish and Game for over a year to assure that any possible fish and wildlife losses would be mitigated. Subsequent to the Prehearing Conference, the Department had further meetings with Fish and Game and they are now satisfied with the Department's reasons for selecting the site for the Bottle Rock Powerplant. In addition, if it becomes commercially feasible to develop the BLM leasehold, Fish and Game has been assured that consideration will be given to interconnecting the two projects. Finally, the Department is actively working with the Department of Fish and Game to answer the concerns which they raised in their letter of November 20, 1978, to the Commission regarding the Bottle Rock Powerplant.

Attached, for the record, is a letter from the Department of Fish and Game which confirms the above.


Lloyd H. Harvego
Deputy Chief
Energy Division
8-485-9200

Attachment

Memorandum

To : Mr. Ronald B. Robie, Director
Department of Water Resources
1416 Ninth Street
Sacramento, CA 95814

Date: January 16, 1979

From : Department of Fish and Game

Subject: DWR's Bottle Rock Powerplant

At the hearing before the California Energy Commission on January 9, 1979, the Department of Fish and Game raised concerns with respect to the location of the proposed Department of Water Resources' (DWR) Bottle Rock Powerplant, and its relationship to the BLM leasehold which DWR recently obtained.

After discussion between our staffs on January 11 and January 15, the Department of Fish and Game now has a better understanding of DWR's reasons for selecting Site 4 as the preferred Bottle Rock Powerplant site and the overriding considerations that prevent the selection of the site recommended by my staff.

With your assurance that fish and wildlife losses will be mitigated in compliance with CEQA and the Davis-Dolwig Act, our concerns will be satisfied. To this end, our respective Departments have been working together to identify appropriate mitigation measures, and as such have already responded to some of the concerns raised in our letter of November 20, 1978, to the California Energy Commission.

The Department of Fish and Game is pleased with your department's efforts to consolidate facilities in an effort to reduce the disturbance factors associated with human activity on the leasehold. Implementation of the concept of developing multiple wells from a single drilling pad which thereby limits the number of well pad sites for the Bottle Rock project is a concept we support.

It is also our understanding that, if it becomes commercially feasible to develop the adjacent BLM leasehold recently obtained by DWR, that consideration will be given to interconnecting the two projects. We would also support this consolidation if it further reduces impacts to fish and wildlife.

My staff will continue to be available to assist you in planning the most environmentally acceptable project.

EC Fullerton
Director

Staff 1/18/79

STATE OF CALIFORNIA
STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

78-N01-7

In the Matter of:)
)
Notice of Intention of the)
California Department of Water)
Resources to File an Application)
for Certification)
Re Bottle Rock Geothermal Power)
Plant)

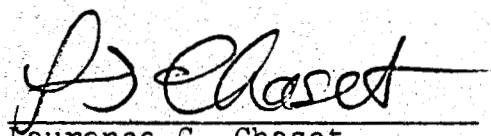
DOCKET NO. 78-N01-7

Commission Staff Response to
Department of Fish and Game
Comments on the proposed
Bottle Rock Plant Site.

The Staff of the Energy Resources Conservation and
Development Commission hereby submits its Response to the Department
of Fish and Game's Comments on the proposed Bottle Rock power
plant site.

Dated: January 18, 1979

Respectfully submitted,



Laurence G. Chaset
Staff Counsel

Memorandum

To : Commission Committee on DWR Bottle Rock
(78-NOI-7)

Date : January 18, 1979

From : Energy Resources Conservation
and Development Commission
1111 Howe Avenue
Sacramento, 95825

COMMISSION STAFF

Windy B. Reed

Subject: Response to Department of Fish and Game comments on the proposed Bottle Rock power plant site

In a memo dated November 20, 1978 and verbally at the Prehearing Conference The Department of Fish and Game (DFG) has expressed several concerns with the proposed Bottle Rock Power Plant site. The primary concern revolves around the loss of wild life habitat at the proposed site and the associated suitability of the proposed site as opposed to an alternative site, (next to the Francisco well pad) suggested by DFG. In addition DFG has expressed concern regarding the possibility of coordinating the planning of development of this project with future projects, the mitigation measures to be implemented and the size of the site to be developed.

Response

1. The Joint Biological Findings and Conclusions concur that development of the proposed site would result in the loss of a valuable wild life habitat. However before elaborating on that point, it must be pointed out that staff does not necessarily believe the alternative site is appropriate. With regard to the loss of the habitat, finding 15 states, "The Department of Fish and Game has indicated that it considers the proposed power plant site, Ponderosa pine-mixed evergreen forest, to be valuable wildlife habitat. However, if adequate mitigation measures are implemented, the losses associated with the proposed site are not so severe as to render the project unacceptable."

As stated in the staff biological resources position paper (pg. 4), staff's position is that loss of forested wildlife habitat cannot be adequately mitigated. The problem in mitigating for losses of forested habitat is the long time element involved in creating a natural forest, several hundred years. The more mature stands can represent time spans of more than a thousand years. Some mitigation can be implemented by providing artificial nesting sites in adjacent forest areas to partially compensate for lost forest habitat. This is usually done by providing nesting boxes for birds and squirrels. This approach is only effective to the extent that the surrounding forest wildlife population is limited due to nesting sites availability; other factors such as food supply, protective cover, and territorial behavior patterns, may be more limiting.

Other forest management programs can be implemented to enhance local carrying capacity, such as selective management for trees of greatest value as food sources, selection of trees of value for nesting sites, and creation of habitats utilized by large mammals, such as deer and planting of new forests.

While the Ponderosa pine-mixed evergreen forest is one of the more valuable on-site wildlife habitats, the impact of the loss of 6+ acres associated with the power plant site development is not, in staff's opinion, significant enough to find the site unacceptable. From the biological resources perspective there are other areas in the leasehold which represent preferable locations to site a power plant, particularly within the chaparral habitat.

2. The Hearing Order directs the staff and applicant to elaborate on the suitability of the proposed site as opposed to the site suggested by the Department of Fish and Game.

The biological resources staff agrees with the Department of Fish and Game that location of the site in a chaparral area should be considered (Biological Resources Position Paper, pg. 4). However, the biological resources staff also recognizes that the site proposed by Fish and Game may have potential major problems associated with other technical areas.

Specific technical area comments regarding relocation of the site to the alternative proposed by DFG include:

Geotechnical:

The Department of Fish and Game (DFG) has suggested an alternative to the site proposed by the Applicant. Although precise information as to the exact location of the DFG site is lacking, it is apparently located adjacent to the Francisco well pad. As is indicated in the NOI and outlined in the Staff Position Paper on Geotechnical Issues, the location of the Francisco well pad itself is of some concern. The concern, is caused by a fault, which may be seismically active, passing within 50 meters of the well pad. The fault trends northwest and depending upon the proposed plant layout, may pose a threat to engineered structures which could be difficult and expensive to mitigate. The staff considers the plant site proposed by the Applicant to be situated in a more ideal location with respect to geotechnical concerns.

Noise:

If the Bottle Rock facility were located in the general area of the Francisco wells, the project would potentially have a greater impact on the noise sensitive receptors in the site area than the DWR proposed site. The Francisco well site is nearer to the noise sensitive receptors. The proposed project at the Francisco well site would potentially have greater difficulties in meeting applicable regulations than the DWR proposed site.

Air Quality:

With existing data in the NOI supplemental data and the air quality analysis study, the Applicant has undertaken to evaluate the impact of DWR/Bottle Rock on sensitive receptors.

Topographical and associated meteorological conditions (ie: downwash, drainage and subsidence inversion) may be significantly different at the Francisco site. Proximity of the plant to the receptors could change the H₂S impacts significantly.

Under these circumstances Staff would not have sufficient data to adequately evaluate the impacts of the project if it were relocated at the Franciscan well area as proposed by the Department of Fish and Game and would be unable to adequately evaluate alternatives to the proposed DWR/Bottle Rock site.

Cultural Resources:

Information provided in the NOI shows an archaeological site (CA-Lak-608) in the Francisco leasehold. The site is situated 30 meters from the access road to the leasehold. Information on the exact location of CA-Lak-608 is not available. However, due to the size of the facility and present layout, the archaeological site will undoubtedly be destroyed by construction activities.

Preservation of the archaeological site is preferable. However, if the destruction of the site is unavoidable then a full scientific study of the site should be undertaken.

3. The Hearing Order directs the staff and applicant to address the possibility of coordinating the planning of development of this project with future projects.

The biological resources staff position relating to this concern is stated in Finding 24.

"Both the U.S. Fish and Wildlife Service and the California Department of Fish and Game have stated concern over the acceptability of cumulative impacts from this and other geothermal projects. This is not an issue which can or should be resolved within the context of this NOI, as it is a problem which is generically associated with all geothermal development in the Geysers region. Accordingly, Staff recommends that the Committee should request the full Commission to institute a generic proceeding to identify these cumulative impacts to an acceptable level."

The staff recommends that workshops and hearings be conducted leading to generic findings.

4. With regard to mitigating potential biological impact, the Joint Biological conclusion number 3 states, "With the implementation of the measures referred to in Conclusion No. 1, and subject to further evaluation during the AFC, the Bottle Rock power plant and related facilities is acceptable from the standpoint of biological resources."

The above conclusion is based on the determination of site acceptability as submitted and proposed by the applicant. It is not a statement that the proposed site is the best possible alternative site. The measures referred to in Conclusion No. 1 relate to mitigation measures to control soil erosion and for the protection and preservation of biological resources. The mitigation measures to be considered also include the comprehensive mitigation program guidelines presented by the Department of Fish and Game (letter dated 11/20/78). The mitigation measures presented in these sources are general procedures. Staff anticipates that the applicant will submit a site specific mitigation plan for the AFC which will implement the recommended measures.

5. Finally in response to DFG's comment regarding loss of habitat due to the size of the site proposed for power plant development, staff believes that the mitigation of potential loss of forest habitat also includes reducing the loss of habitat. This can be accomplished by a compact plant layout which reduces the space between buildings and provides for minimal corridor widths for roads, transmission lines, and steam supply lines. Support facilities such as equipment storage areas and parking areas can be located nearby but outside of the forested area.

It is expected, as a part of the overall design criteria that environmental issues be taken into account by DWR to minimize environmental degradation as a part of the engineering process. Also, it would in the natural course of economics, be in the best interests of the Applicant to minimize grading costs by keeping to a minimum the amount of grading required to construct the plant.

Memorandum

To : Bottle Rock Committee

Date: February 5, 1979

Telephone: ATSS ()
()

From : California Energy Commission - Jim Brownell
1111 Howe Avenue - Wendy B Reid
Sacramento, 95825

Wendy B. Reid

Subject: DWR BOTTLE ROCK PROJECT COMPLIANCE WITH BIOLOGICAL RESOURCES LAWS AND STANDARDS

1. Applicable Regulations

- Federal Endangered Species Act of 1973 and implementing regulations.
- Ecological Reserve Act of 1968 and implementing regulations, Fish and Game Code Sections 1580-1584.
- California Species Preservation Act of 1970, Fish and Game Code Sections 900-903.
- California Endangered Species Act of 1970, Fish and Game Code Sections 2050-2055.
- Fully Protected Species Act, Fish and Game Code Sections 3511, 4700, 5000 and 5515.
- Native Plant Protection, Fish and Game Code Sections 1900-1913.

2. Compliance

Based on the information supplied at this time there is a reasonable likelihood that the DWR Bottle Rock geothermal project will be in compliance with the above applicable laws or standards which have been identified in the Findings and Staff Position Paper.

3. Augmentation and/or Clarification

It is staff's position that the level of data provided in the NOI is adequate to determine there is a reasonable likelihood that compliance with state and federal regulations governing legally protected species can be met. However, staff recognizes that site specific studies have not been conducted of areas that will be disturbed along the proposed steam supply lines and transmission lines. Plants which are of concern as rare and endangered species potentially occur in the project area. If these species do occur in areas subject to disturbance there are measures which can be implemented to reduce adverse impacts or the area the species occurs in can be avoided.

February 5, 1979
Page 2

It is staff's understanding that the Applicant will conduct studies of areas which will be subject to disturbance during construction and operation of the power plant and related facilities to locate the plant species of concern. The Applicant will include, in the AFC filing or before, mitigation plans which will avoid losses of these species or mitigate for unavoidable losses.

4. Department of Fish and Game Comments - November 20, 1978

The remaining regulations cited in Fish and Game's comment are procedural in nature and not substantive in this case.

APPENDIX F

Following is the Applicant's response to the January 12, 1979, Committee ORDER regarding the status of negotiations for transmitting power from the proposed project out of the Geysers.

STATUS OF TRANSMISSION NEGOTIATIONS

78-NOI-7

RECEIVED

FEB 5 1979

ENERGY COMMISSION
RECEIVED

The Committee's Notice of Evidentiary Hearings and OR

FEB 2 1979

Hearing Order mailed January 15, 1979, ordered submission of the following:

"...a report on the status of negotiations with Pacific Gas and Electric Company concerning use of the latter's facilities for transmitting the power which would be generated by the proposed project out of The Geysers area. Such report shall also deal with any alternative methods of transmission which DWR would consider using in the event that PGandE's facilities could not be used. This report shall be submitted by February 5, 1979."

PGandE is aware of Applicant's requirement to file this report and offered to work with Applicant to draft and submit a joint statement. However, due to short time frames, Applicant is submitting this report and sending a copy to PGandE.

On August 2, 1978, the Applicant petitioned for intervention in the matter of Pacific Gas and Electric Company's Geysers Unit 17, Docket No. 78-NOI-3, in order to insure that PGandE allow for and design their Unit 17 switchyard so as to permit connection of a transmission line to be built by Applicant in conjunction with the Bottle Rock Geothermal Powerplant.

On August 21, 1978, the Applicant (Department) and PGandE signed and submitted to the Docket (78-NOI-3) an agreement and stipulation concerning intervention in which PGandE agreed to design and construct the Unit 17 switchyard or associated transmission facilities to permit a connection that will provide a means for Applicant (Department) to deliver energy from the Bottle Rock Powerplant into PGandE's system.

PGandE also agreed to provide transmission service out of The Geysers to loss measuring points for delivery to State pumping facilities and other such points as mutually agreed under terms and conditions to be agreed. The stipulation and agreement provided that the Applicant (Department) agreed to withdraw its petition for intervention on the basis of transmission.

Since that time Applicant and PGandE have met frequently and exchanged draft agreements and comments toward agreeing to specific terms and conditions. It should be pointed out that Applicant (Department) has several existing generating facilities and loads within the PGandE service area which are connected to existing PGandE transmission facilities.

In the context of these meetings, PGandE has agreed to provide transmission service from the proposed Bottle Rock and other proposed Geysers geothermal powerplants to the Department's pumping plants within the PGandE service area and to points of interconnection with the Southern California Edison Company (SCE) for the Department's pumping loads in the SCE service area. Agreement has been reached on certain requirements for reserves.

Agreement has not yet been reached on rates, losses, and handling of capacity and energy when not applied to pumping loads.

The parties believe that progress has been made in narrowing and resolving issues and that a mutually satisfactory agreement can be reached.

APPENDIX G

Following is the Applicant's response to the January 12, 1979, Committee ORDER regarding the status of the steamfield development permits.

PERMITS AND ENVIRONMENTAL DOCUMENTS
FOR FRANCISCO LEASEHOLD

RECEIVED
FEB 5 1979
HEARING OR

I. EXPLORATORY WELLS:

ENERGY COMMISSION
RECEIVED

An Environmental Impact Report (EIR) was prepared on the FEB 2 1979 Francisco Leasehold and reviewed through the State Clearinghouse (SCH) as SCH No. 75082628. Last spring a subsequent EIR was prepared under Section 15067 of the State EIR Guidelines to supplement the original EIR (SCH No. 75082628). For the purposes of the California Environmental Quality Act (CEQA), the project definition was for the exploratory well drilling phase and included two well pads, with from one to six wells on each pad. The County has issued conditional use permits for three exploratory wells on the Francisco pad and 1-3 wells on the Coleman pad. Any additional wells will be covered under the full-field phase EIR.

McCulloch Geothermal Corporation applied for and obtained permits from the relevant state and local regulatory agencies.

A. FRANCISCO PAD:

County of Lake: Conditional use permit
Permit issued January 1976
Permit expires October 1980

Division of Oil and Gas: Permit to drill a geothermal well.
(Issued on a well-by-well basis)
Permit issued on well 1-5; 1/76
Permit issued on well 2-5; 4/76
Permit issued on well 3-5; near future.

Central Valley Regional Water Quality Control Board
(CVRWQCB)

discharge requirements and monitoring
Permit issued 8/76; valid for life of
project.

Air Pollution Control District: authorities to construct

Permits issued on wells #1-5; 2-5 in
1/76; 3-5 in 2/79
Permits expire June 30 each year and
must be renewed annually.

B. COLEMAN PAD:

County of Lake: conditional use permit

permit issued 9/78
permit expires 9/80

Division of Oil and Gas: Permit to drill a geothermal
well.

Permit issued 1/79

CVRWQCB: Discharge requirements and monitoring
Permit issued 8/76; valid for life
of project.

Air Pollution Control District: authority to construct

Permit issued 11/78
Permit expires June 30 each year and
must be renewed annually

II. FULL-FIELD DEVELOPMENT:

For the purposes of CEQA, the County of Lake will be preparing
an EIR on McCulloch's plans to develop the steamfield

(including conveyance lines, additional wells, etc.).

McCulloch made an application to the County for a conditional
use permit on 9/21/78. Under the provisions of AB884,

enacted in 1978, the County will have one year to complete
its CEQA responsibilities. The County's EIR will be

reviewed through the State Clearinghouse. Responsible

agencies from which McCulloch must obtain permits will have
180 days from the time that the County certifies its EIR to

issue their permit.

In addition, McCulloch either has or will apply to the following state and local regulatory agencies for permits to construct and operate the field.

Air Pollution Control District: Authority to construct application deemed approved 11/78

Division of Oil and Gas: Permits to be obtained on a well-by-well basis.

CVRWQCB: Permit granted for exploratory and full field development for discharge requirements and monitoring in 8/76.

III. POWERPLANT:

In addition to submitting a Notice of Intent to the California Energy Commission to site a geothermal plant which is currently undergoing regulatory review, the Department has submitted an application to the Lake County Air Pollution Control District. As of December 27, 1978, that application for an authority to construct was deemed complete for processing. Authorities to Construct are valid for one year or until an authority to operate is required, whichever comes first (see attachment). Authorities to construct may be renewed annually for a period not to exceed four years.

Any possible discharges from the powerplant, would be covered by McCulloch's permit with the CVRWQCB.



COUNTY OF LAKE

Air Pollution Control District
Courthouse — 255 N. Forbes Street
Lakeport, California 95453
Telephone 707/263-2391
Laboratory: 707/263-2192
Burn, Info.: 707/263-3121

5.91
1/10
E. J. Terhaar
1/10/79

FAYNE L. TUCKER
Air Pollution Control Director

January 10, 1979

670.00

Mr. E. J. Terhaar
Chief, Energy Division
Department of Water Resources
Resources Building
P. O. Box 388
Sacramento, California 95802

Re: Bottlerock Power Plant

Dear Mr. Terhaar:

This letter is to inform you that as of December 27, 1978, your application for an Authority to Construct for the above-referenced project has been accepted as complete.

Any additional information that may be required during the District's analysis of the project will be of a supplementary nature.

Sincerely,

Steve Zalusky
Steve Zalusky
Acting Director, LCAPCD

SZ/pd

APPENDIX H
Exhibit List

STATE OF CALIFORNIA
STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the matter of:

Notice of Intention of Department
of Water Resources to File
an Application for Certification
Re: DWR Bottle Rock

DOCKET NO. 78-NOI-7

Exhibit List

Exhibit List No.

- 1 Bottle Rock Notice of Intention List of Submittals on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 2 Declaration of Mike Smith and Staff Position Paper on Socio-Economic on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 3 Declaration of Dr. Fredrickson and Staff Position Paper on Cultural Resources on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 4 Declaration of Gary Heath and Staff Position Paper on Cultural Resources on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 5 Declaration of Richard Lallatin and Staff Position Paper on Civil Engineering/Solid Waste Management on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 6 Declaration of Dale Martfeld and Staff Position Paper on Soil on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 7 Declaration of Martin Homec and Staff Position Paper on Water Quality on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 8 Declaration of Larry Chee and Staff Position Paper on Water Resources and Paper on Hydrology on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 9 Declaration of Zene Bohrer and Staff Position Paper on Soils on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 10 Declaration of Robert Chittenden and Staff Position Paper on Structural Engineering on behalf of CEC. Marked for identification and admitted January 25, 1979.

- 11 Declaration of Marco Farrockhrooz and Staff Position Paper on Civil Engineering/Solid Waste Disposal on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 12 Declaration of Richard Kishi and Staff Position Paper on System Engineering on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 13 Declaration of Albert Torres and Staff Position Paper on Reliability and Safety on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 14 Declaration of Bruce Stiver and Staff Position Paper on Reliability and Safety on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 15 Declaration of Phillip Leitner and Staff Position Paper on Biological Resources on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 16 Declaration of Richard Buell and Staff Position Paper on Noise on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 17 Declaration of Ronald Shimizu and Staff Position Paper on Air Quality on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 18 Declaration of Jeffrey Anderson and Staff Position Paper on Air Quality on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 19 Declaration of Gary Steenhoek and Paper on Biological Resources and Site Selection with a letter from Department of Fish and Game.
- 20 Declaration of James Brownell and Position Paper on Biological Resources on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 21 Declaration of William Simmons and Report entitled "The Effects of Long Term Exposure to Low Concentration of Hydrogen Sulfide on Human Health and Well Being In the Ambient Atmosphere." Marked for identification and admitted January 25, 1979.
- 22 Declaration of Nancy Post and Staff Position Paper on Public Health on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 23 Declaration of John Marlette and Staff Position Paper on Need/Demand Conformance on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 24 Declaration of Kent Murray and Staff Position Paper on Geotechnic Issues on behalf of CEC. Marked for identification and admitted January 25, 1979.

- 25 Declaration of Lloyd Harvego and Staff Position Paper on Need/Demand Conformance Issues on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 26 Declaration of Dale Neilson and Staff Position Paper on Need on behalf of CEC. Marked for identification and admitted January 25, 1979.
- 27 Declaration of Ray Chantler and Staff Position Paper on Geotechnical Issues on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 28 Declaration of Judy Warburg and Applicable Laws, Regulations and Ordinances on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 29 Declaration of Eugene Serr and Staff Position Paper on Hydroglogy on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 30 Declaration of Darwin Hall and Staff Position Paper on Socio-Economic Impacts on behalf of DWR. Marked for identification and admitted January 25, 1979.
- 31 Illinois Institute for Environmental Quality, "Hydrogen Sulfide Health Effects and Recommended Air Quality Standard.", published March, 1974. Submitted by Mr. Simmons, DWR. Marked for identification and admitted January 25, 1979.
- 32 Appendix B, Leroy Schieler. Submitted by Mr. Simmons, DWR. Marked for identification and admitted January 25, 1979.
- 33 Appendix C, "The Air Pollution Situation In Terre Haute, Indiana with Special Reference to The Hydrogen Sulfide Incident of May-June 1964, published June, 1964. Submitted by Mr. Simmons of DWR. Marked for identification and admitted January 25, 1979.
- 34 Performance Properties of Casing, Tubing, and Drill Pipe, published March 1975. Submitted by Mr. McNay of DWR. Marked for identification and admitted January 25, 1979.
- 35 Youngstown Engineering Data "Oil Country Tubular Goods", published April 1971. Submitted by Mr. McNay, DWR. Marked for identification and admitted January 25, 1979.
- 36 Steam Production Zone and Cross Section of The Geysers Map. Submitted by Dr. Grose, DWR. Marked for identification and admitted January 25, 1979.

APPENDIX I

Following is a list of laws tentatively deemed applicable to the proposed project.

Tentatively Applicable
Standards, Ordinances, and Laws
DWR Bottle Rock

Category	Applicable Laws, Ordinances, Standards	Relevant Findings Regarding Compliance	Preliminary Conclusions Regarding Compliance
I. Air Quality and New Source Review	Lake County Air Pollution Control District Rule 411 LCAPCD Rule 235 LCAPCD Rule 412 LCAPCD Rule 421.1 LCAPCD Rule 430 LCAPCD Rule 602, 604 Northern Sonoma County Air Pollution Control District (NSCAPCD) Rule 455(b) State Ambient Air Quality Standard for H ₂ S Applicable NSR Rules proposed by ARB	Findings 1, 2, 3, 13, 14 Finding 15 Findings 4, 5, 13, 14 Findings 30, 31, & 13, 14 Findings 6, 13, 14 Findings 9, 11, 13, 14 Findings 10, 11, 12 Findings 12, 13 Findings 16 - 27 Conclusions 1 - 4	Further information is required.

Category	Applicable Laws, Ordinances, Standards	Relevant Findings and Conclusions	Preliminary Conclusions Regarding Compliance
II. Biological Resources	Federal Endangered Species Act of 1973 and implementing regulations	Findings 1 - 24 and Conclusions 1, 2, and 3	Subject to further evaluation at the AFC the construction and operation of this facility will comply with these standards. Applicant shall undertake the requisite mitigation efforts identified in findings 12, 14, 18, and 22 and submission of information as noted in findings 14, 16, 18, and 23.
	Ecological Reserve Act of 1968 and implementing regulations, Fish and Game Code sections 1580-84	" "	
	Calif. Species Preservation Act of 1970, Fish and Game Code sections 900-903	" "	
	Calif, Endangered Species Act of 1970, Fish and Game Code sections 2050-55	" "	
	Fully Protected Species Act, Fish and Game Code sections 3511, 4700, 5000, and 5515	" "	
	Native Plant Protection, Fish and Game Code sections 1900- 1913	" "	
III. Civil Engineering/ Solid Waste Management	Uniform Building Code, 1976 "Waste Discharge Requirements for Nonsewerable Waste Disposal to Land" (California State Water Resources Control Board, January 1978)	Findings 1 - 9 Conclusions 1 - 4	Unit acceptable from Civil Engineering standpoint for purposes of the NOI but is subject to further evaluation at AFC. Applicant shall undertake measures referred to in findings 6, 8, and 9 and supply information specified in finding 1.

IV. Cultural Resources	<p>National Historic Preservation Act of 1966, 16 U.S.C. 470 et. seq., 36 CFR 800.</p> <p>Native American Historical, Cultural and Sacred Sites, PRC 5097.9 et. seq.</p>	<p>Finding 2 Conclusions 1 - 3</p>	<p>Subject to evaluation of additional data, the proposed project will comply with identified laws.</p>
V. Geotechnology	<p>No adopted standards governing the acceptability of site seismic characteristics</p>	<p>Findings 1 - 4 Conclusion 1</p>	<p>Seismic design criteria for critical structures are appropriate.</p>
VI. Hydrology	<p>No specific standards</p>	<p>Findings 1 - 4 Conclusions 1 - 2</p>	<p>Proposed facility subject to further review at AFC re: spill-related flooding events.</p>
VII. Need/Demand Conformance	<p>Public Resources Code 25309</p>	<p>Findings 5 - 16 Conclusion 2</p>	<p>Plant is ultimately needed.</p>
VIII. Noise	<p>Lake County General Plan, Noise Element</p> <p>CAL-OSHA, 8 Cal. Admin. Code sections 5095-5099, and Cal. Vehicle Code section 23120</p> <p>Occupational Safety and Health Act of 1970.</p>	<p>Findings 1, 4, 5, 6, 7, 8, 10, 11, 12, and 13 Conclusions 1 - 10</p> <p>Findings 2, 4, 7, 9, 10, 11, 12, and 13 Conclusions 1 - 10.</p> <p>Findings 3 and 4-10.</p>	<p>Subject to further evaluation at the AFC, the proposed project is acceptable from the standpoint of noise impacts provided the mitigation efforts identified in findings 7, 8, and 9 and information required in Finding 13 are completed.</p>

Category	Applicable Laws, Ordinances, Standards	Relevant Findings and Conclusions	Preliminary Conclusions Regarding Compliance
IX. Public Health A. H ₂ S	State Ambient Air Quality Standards for H ₂ S	Findings 1 - 4 Conclusions 1 - 3	More information required.
B. Ammonia, Ammonium Compounds, Sulfates	California Occupational Safety and Health Standard for Ammonia	Findings 1 - 7 Conclusions 1 - 3	
	California Ambient Air Quality Standard for Suspended Sulfates	Findings 8 - 12 Conclusions 4 - 5	Ambient air quality for sulfates not exceeded, no adverse health impacts
C. Arsenic	National Institute for Occupational Safety and Health Standard	Findings 1 - 6 Conclusions 1, 2	Further information required
D. Mercury		Findings 1 - 11 Conclusions 1 - 3	Requires more information although addition of mercury to food chain from plant operation will not adversely affect public health.
E. Radionuclides	California Standard for ²²² Rn 17 California Administrative Code 30355	Findings 1 - 8 Conclusions 1, 2	²²² Rn content in steam supply should not cause an adverse public health impact. Further information is required as specified in finding 8.
F. Sulfur Dioxide	CARB Ambient Air Quality Standard for SO ₂	Findings 1 - 3 Conclusion 1	Ambient air concentrations of SO ₂ from plant operation will not adversely affect public health.
G. TSP	CARB Standard for TSP	Findings 1 - 5 Conclusions 1 - 4	Further information required however, emissions of TSP should not adversely affect public health.

Category	Applicable Laws, Ordinances, Standards	Relevant Findings and Conclusions	Preliminary Conclusions Regarding Compliance
X. Reliability and Safety	Fire Protection and Occupational Safety Regulations, Title 8, Cal. Admin. Code. American Society of Mechanical Engineers Code (ASME Code) Section III, unfired pressure vessels ICC specifications 3 A or 3AA seamless steel cylinders. Various unspecified ICC standards, and NFPA Codes.	Findings 1 - 9 Conclusions 1 - 6	Based on Applicant's agreement to provide information as specified in finding 5, the project is acceptable from the standpoint of plant reliability for NOI purposes. Subject to implementation of measures specified in findings 7 - 9 the project is acceptable from the standpoint of plant safety for purposes of the NOI.
XI. Socio Economic	No codified standards	Findings 1 - 12 Conclusions 1 - 7	Project does not appear incompatible with local land use plans or burdensome upon services of local jurisdictions.
XII. Soils	Waste Discharge Requirements for Non-Sewerable Waste Disposal to Land-Disposal Site Design and Operation Information (January 1978) by the California State Water Resources Board.	Findings 1 - 4 Conclusions 1 - 3	The Applicant will provide the information specified in finding No. 4. Provided the Applicant implements the mitigation measures specified in findings No. 3 and subject to further evaluation during the AFC, the proposed project is acceptable. With the exception of Sections II C7 and C8, Applicant will adhere to the requirements of IIB and IIC of the Lake County Planning Commission Resolution 75-154.

Category	Applicable Laws, Ordinances, Standards	Relevant Findings and Conclusions	Preliminary Conclusions Regarding Compliance
XIII. Structural Engineering	Uniform Building Code (1976 Edition) Titles 8, 24 of Cal. Administrative Code	Findings 1 - 8 Conclusions 1 - 4	The Applicant shall design and construct the facility as specified in findings 1, 3, 4, and 8 and perform as specified in finding 5. The Applicant shall provide information specified in findings 3 and 9. The proposed structural design re: seismic performance and design will be determined at AFC.
XIV. Systems Engineering	No adopted standards; Applicant's design will provide alarms or shutdown instrumentation	Findings 1 - 4 Conclusions 1 - 2	Subject to further evaluation at AFC stage project is acceptable from systems engineering standpoint. Applicant shall submit information specified in findings 2, 3, and 4.
XV. Water Quality	Porter-Cologne Water Quality Act California Regional Water Quality Control Plan, Sacramento River Basin (5A) Federal Clean Water Act, 33 USC 1321 "Waste Discharge Requirements for Non-Sewerable Waste Disposal to Land" January 1978, California State Water Resources Control Board.	Findings 1 - 8 Conclusions 1 - 5 " " " " " "	Subject to further evaluation of information required by findings 6, 7, and 8 and provided the proposals in findings 2, 3, and 6 are followed, the project is acceptable from the standpoint of Water Quality.

XVI. Water Resources

No standards adopted

Findings 1 - 4
Conclusion 1

The construction and operation of this facility will not adversely affect fresh water resources.

APPENDIX J

Glossary

Appendix J
SOME LEGAL TERMS COMMONLY USED IN
NOTICE OF INTENTION PROCEEDINGS

AFFIDAVIT

a written statement of facts sworn to be true before a notary public or other person authorized to administer oaths

BRIEF

a written summary of facts, points of law, and arguments filed for the information of the decision-maker

CROSS-EXAMINATION

questioning by one party of another party's witnesses in order to test the truth of the testimony or other evidence given, and for other purposes such as to gain additional information

DECLARATION

a written statement of facts declared to be true under penalty of perjury

DOCKET

the official repository of all correspondence and other information formally received by the Commission, as well as the hearing record, in a proceeding

DUE PROCESS

a legal concept which involves principles of fairness, including the right to notice, an opportunity to be heard and rebut opposing evidence, and a decision based upon the record

EVIDENTIARY HEARINGS

a proceeding in which testimony and other evidence is given under oath and may be subjected to cross-examination

EX PARTE CONTACT

unethical communication by or on behalf of one party alone to the decision-maker, outside the hearing process, which goes to the merits of the case

EXPERT EVIDENCE

testimony given in relation to some scientific, technical, or professional matter by one qualified to speak because of training, skill, education, or experience

FINDINGS

a decision on a necessary or disputed matter of fact reached by the decision-maker

HEARSAY

a statement made outside the proceeding, but used within the proceeding, to prove or disprove a matter in dispute

INFORMATIONAL HEARING

a Commission Committee sponsored meeting to permit: 1) the Applicant to publicly present its project; 2) the Staff to comment upon issues that arise from the Notice; and 3) the public to ask questions of the Applicant and Staff and make comments regarding the proposed project.

INTERVENOR

a person or public agency who voluntarily elects to formally participate in the proceedings; an intervenor has the full measure of rights afforded to a party

ISSUE WORKSHOPS

a meeting sponsored by the Commission staff for the purpose of discussing with the Applicant, intervenors, and interested public those matters which present issues for resolution by agreement or by Evidentiary Hearings

OFFER OF PROOF

the relevant points one expects to make through testimony offered or a request to cross-examine

ORDER

a direction given by the decision-maker

PARTY

a person who has been granted leave to intervene and therefore may formally take part in a legal proceeding. A party has the right to present evidence and cross-examine witnesses appearing for other parties. A party also refers to one of the principal participants in a proceeding, e.g. the Staff or Applicant.

PERSON

a natural being or artificial being treated as a natural being, such as a corporation; in Commission proceedings, "person" refers to one who may comment upon the proceedings without becoming a party or intervenor.

PREHEARING CONFERENCE

the time at which Evidentiary Hearings are organized--where matters in dispute and witnesses are identified

TRIER-OF-FACT

the person or persons who have the responsibility to determine what facts have been established by the evidence put forth in a proceeding. In Commission proceedings, the trier-of-fact for the purposes of the Preliminary and Final Reports is the Committee, and for the final decision, the trier is the full Commission.

APPENDIX K

Proof of Service List

STATE OF CALIFORNIA

State Energy Resources
Conservation and Development Commission

In the Matter of:)
)
 Notice of Intention of)
 Department of Water Resources)
 to File an Application for) DOCKET NO. 78-NOI-7
 Certification)
 Re Bottle Rock NOI)
 _____)

PROOF OF SERVICE

APPLICANT

Department of Water Resources
 Ms. Judy Warburg
 1416 Ninth Street, Room 440-40
 Sacramento, CA 95814

PARTICIPANT

McCulloch Oil Corporation
 Attention: W. F. Bates
 10880 Wilshire Boulevard
 Los Angeles, CA 90024

REPORTER

Ron Peters Certified Shorthand Reporter
 7700 College Town Drive, Suite 213
 Sacramento, CA 95826

CALIFORNIA ENERGY COMMISSION

C. Suzanne Reed
 California Energy Commission
 1111 Howe Avenue
 Sacramento, CA 95825

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 California Energy Commission
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Wendy Reid
 Project Manager
 California Energy Commission
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 Sacramento, CA 95825