
FINAL REPORT

ON THE
DEPARTMENT OF WATER RESOURCES'
NOTICE OF INTENTION
TO FILE AN APPLICATION FOR CERTIFICATION
OF
DWR BOTTLE ROCK

78-NOI-7



MAY 1979

MASTER

DISCLAIMER

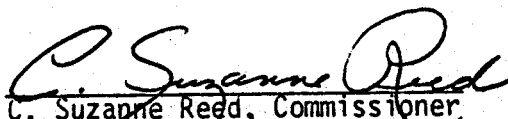
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May 29, 1979

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 Final Report pursuant to Public Resources Code Section 25514.


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

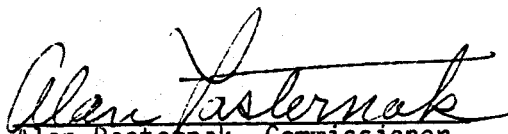

Alan Pasternak, Commissioner
and Member of the Committee

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FOREWORD

This Final Report is substantially similar to the Committee's Preliminary Report issued on March 26, 1979. To large extent, in the absence of any contentions by Staff, Applicant, and other interested participants, the Findings and Conclusions contained in that earlier Report have been adopted, verbatim, for purposes of this Final Report.

The Committee has incorporated certain changes suggested by Staff and Applicant, to the extent appropriate, in various areas of this Report. Most of these are editorial in nature or for the purpose of further clarification, such as changes made in the "Air Quality" Findings. More significant changes are reflected in the section on "Socio-economics"; as discussed in that section, these changes primarily reflect the concerns of the County of Lake, an intervenor in these proceedings, and ensure that consideration of the County's concerns will not be precluded during the Application for Certification process, should the full Commission approve the Notice of Intention as recommended by the Committee.

I. INTRODUCTION

A. The Final 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 55 MW BOTTLE ROCK geothermal power plant 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 Final Report on the DWR Bottle Rock geothermal power plant proposal has been prepared pursuant to California Public Resources Code Section 25514.* This Report presents the final 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 Notice. It also includes a Proposed Decision approving the Notice, with conditions, for consideration by the full Commission. In addition, this Report contains a description of the proposed project (Section I.B.), a summary of the

*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 has issued the Preliminary Report and is issuing this Final Report in accordance with the pre-existing statutory and regulatory provisions.

proceedings to date (Section I.C.), comments from the general public (Appendix B), and government agency comments on the Preliminary Report (Appendix C). This Report also contains the comments of the Applicant and the Commission staff regarding the Preliminary Report (Appendices D and E, respectively). Finally, this Report presents the Committee's view of those issues that require further consideration in future proceedings on the Application for Certification (Section V), should the full Commission approve the NOI as recommended by the Committee.

Pursuant to Public Resources Code Section 25514, this Report presents preliminary Findings and Conclusions on:

- a. Conformity to the forecast of statewide and service area electric power demands;
- b. Conformity of the proposed site and related facilities with applicable local, regional, state, and federal standards, ordinances, and laws, including any long-range land use plans or guidelines adopted by the state or by any local or regional planning agency;
- 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

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 Geology/Seismicity (formerly Geotechnology) 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, Geology/Seismicity, Cultural Resources, and Socio-economics 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 first, the Preliminary Report, and finally this Final 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 Geology/Seismicity. 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 was 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), of the Preliminary Report.

The Joint Statement of Findings and Conclusions, as proposed during the Committee's Prehearing Conference, was set forth in the Preliminary Report and, with few exceptions, has been adopted by the Committee as final Findings and Conclusions pursuant to Public Resources Code Section 25514. 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 Geology/Seismicity. The Committee had, however, revised certain language regarding these issues to more accurately reflect Commission policy and to encompass the evidence adduced from testimony and cross-examination in the course of these proceedings. The Committee revisions on the areas of Public Health and Geology/Seismicity have been accepted without challenge by the Staff and the Applicant and are included in the final Findings and Conclusions contained in this Report. Comments submitted by the Staff on the area of Need (see Appendix E) have led to certain changes in the final Findings and Conclusions on that area.

The Committee conducted a hearing on the Preliminary Report on April 23, 1979 in Lakeport. At that hearing, a representative of the County of Lake affirmed the County's desire to intervene* in the proceedings in order to address certain socioeconomic concerns. Members of the public also submitted comments on the Committee's Preliminary Report and on the acceptability of the proposed project. Though various comments from the County and residents of the area indicated that the area of socioeconomics could need further exploration during the AFC proceedings, neither the County nor any commentor indicated that

*Petition to Intervene filed April 18, 1979; leave to intervene granted April 27, 1979.

the concerns raised could not be mitigated or were sufficient at this time to prevent approval of the NOI.

Following the April 23, 1979 hearing, the Committee scheduled a second evidentiary hearing for May 4 in order to formally receive written testimony and statements of position from the Staff and the Applicant concerning the actual or likely ability of the proposed project to conform with local, regional, state, and federal standards, ordinances, and laws identified by the Committee as tentatively applicable in Appendix I of the Preliminary Report. Witnesses on behalf of Lake County testified regarding the status of the County's land use plans, and the likelihood that the proposed project could conform with such plans. A listing of these standards, ordinances, and laws, and a summary of the Applicant's and the Staff's positions regarding actual or likely conformance therewith, follows the final Findings and Conclusions on each subject area of this Report.

At the May 4 evidentiary hearing, the Staff submitted supplementary written testimony on the areas of Cultural Resources and Socioeconomics. The Applicant and Staff also reported, pursuant to the Committee Order of April 24, 1979, regarding the status of Lake County's concerns and mitigation measures proposed to alleviate such concerns.* The Applicant further indicated that its transmission negotiations with PG&E were still ongoing, and that its prior report on those negotiations was still substantially accurate (see Appendix F of Preliminary Report).

*For a more complete discussion, see "Socioeconomics", Section III.C.13, following.

3. Opportunity for Response

The Committee will hold a Committee Conference on the Final Report on June 18, 1979. At that Conference, any party may testify or make statements of position on the Findings and Conclusions set forth in this Report. In addition, any interested person will be given an opportunity to comment on this Report.

As indicated by the Proposed Decision (Appendix I), the Committee is recommending that the Commission approve the Notice, subject to several conditions. A public hearing on the Final Report and consideration of the Proposed Decision by the full Commission will occur on June 20, 1979. Any party, interested person, or concerned public agency will be given an opportunity to comment on the Final Report and Proposed Decision. The Proposed Decision, with amendments, if any, will be presented for a vote by the Commission. If the Notice is approved, DWR may file an Application for Certification of its Bottle Rock geothermal project. Following further proceedings on the Application, the Commission will act to grant or deny certification. Such action could occur as early as late 1979.

Any person who, after reading this Report, desires to participate in these proceedings or wishes further information or the conduct of future proceedings on this proposed project should contact Stephen Kolb of the Public Adviser's Office at (916) 920-6906 or toll free at (800) 852-7516.

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 cut 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 KCM, 61 strand aluminum conductors (see Figure 3).

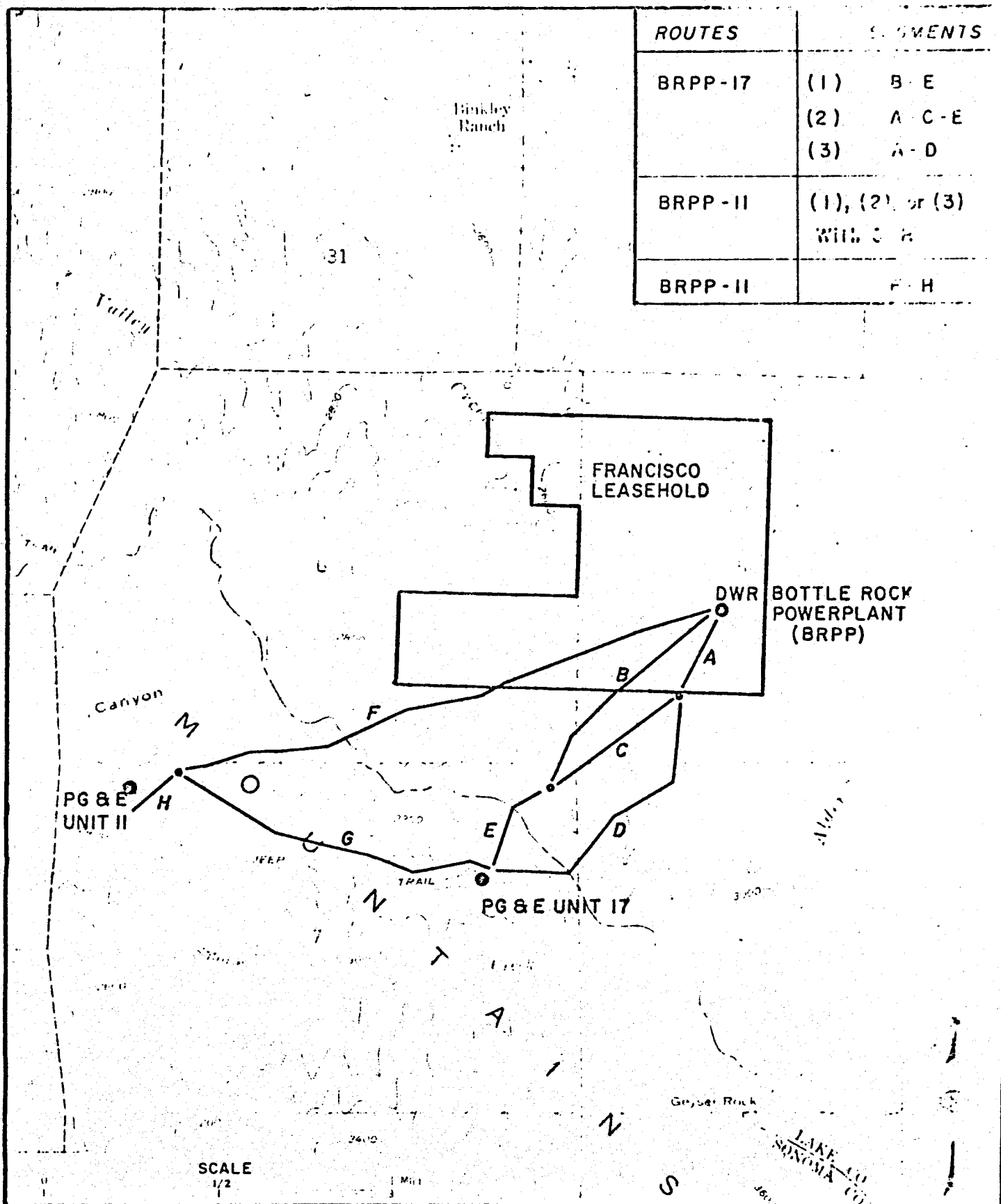
After interconnection with proposed Unit 17, the Applicant anticipates that the power generated by the BOTTLE ROCK project would be transmitted out of The Geysers via PG&E's currently existing transmission routes.* DWR is currently negotiating with PG&E concerning "wheeling" this power, and is also seeking to develop additional feasible alternatives for transmitting its power out of The Geysers. The Committee ordered the Applicant to submit any update on its initial report on the status of its negotiations with PG&E concerning transmission of power from The Geysers (initial report in Appendix F of Preliminary Report); the Applicant's response indicated that negotiations are ongoing and that there are presently no further significant agreements on which to report.

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

*This unit is currently before the Commission in the AFC stage (79-AFC-1).

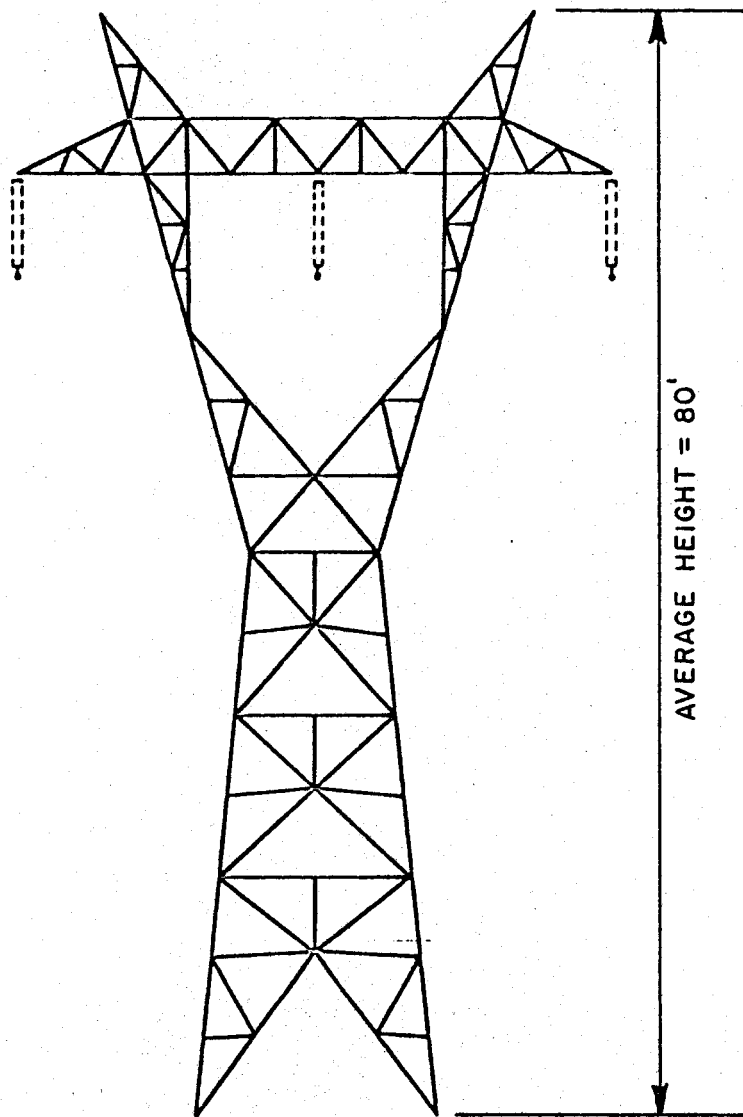
*In the NOI, the Applicant stated that additional transmission capacity which would be provided by construction of transmission lines proposed in the NOI for PG&E's Geysers Unit 16 (78-NOI-6; currently pending before a Committee of the Commission) is needed to get power out of The Geysers (NOI, p. VI-3).



PROPOSED BOTTLE ROCK POWERPLANT TRANSMISSION CORRIDORS

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

FIGURE 2

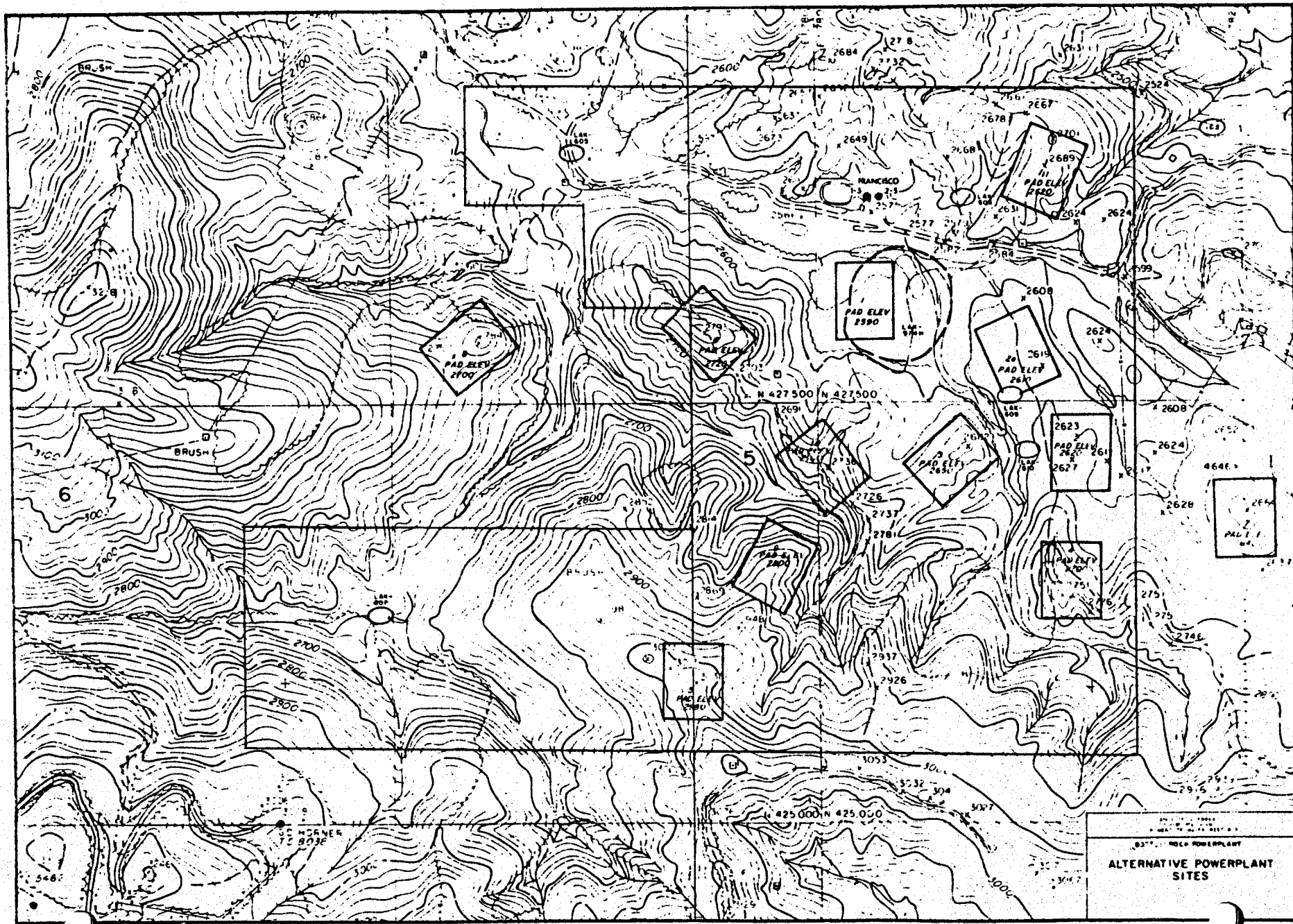


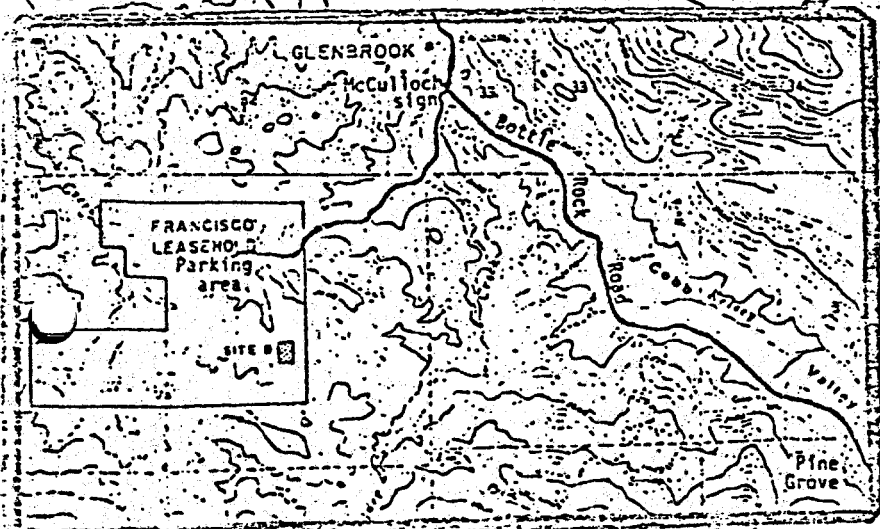
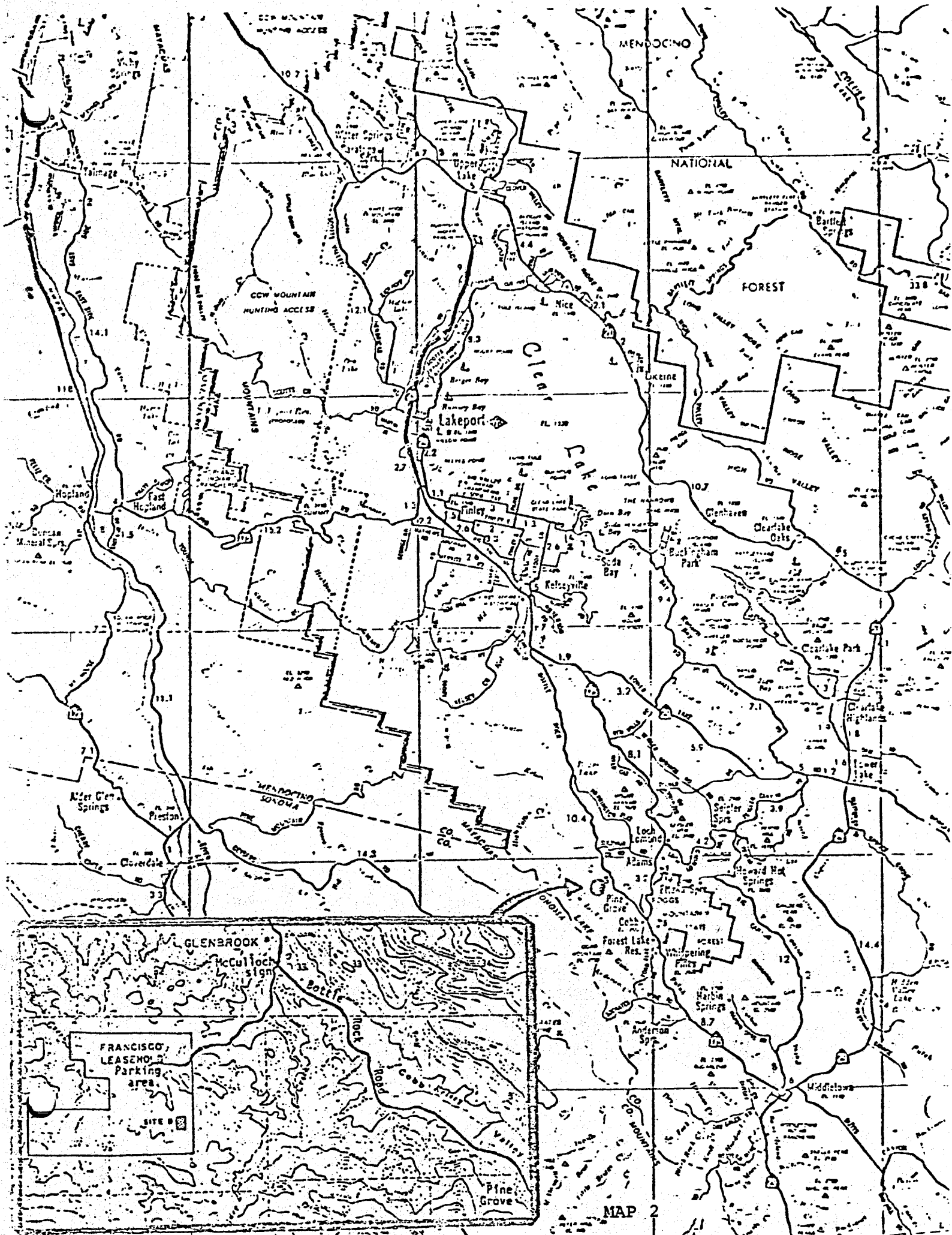
TYPICAL LATTICE TYPE TRANSMISSION TOWER

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 Francisco 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 first evidentiary hearing. A more complete discussion of this matter was contained in Section III.C.3. of the Preliminary Report.





MAP 2

3. The Steam Field

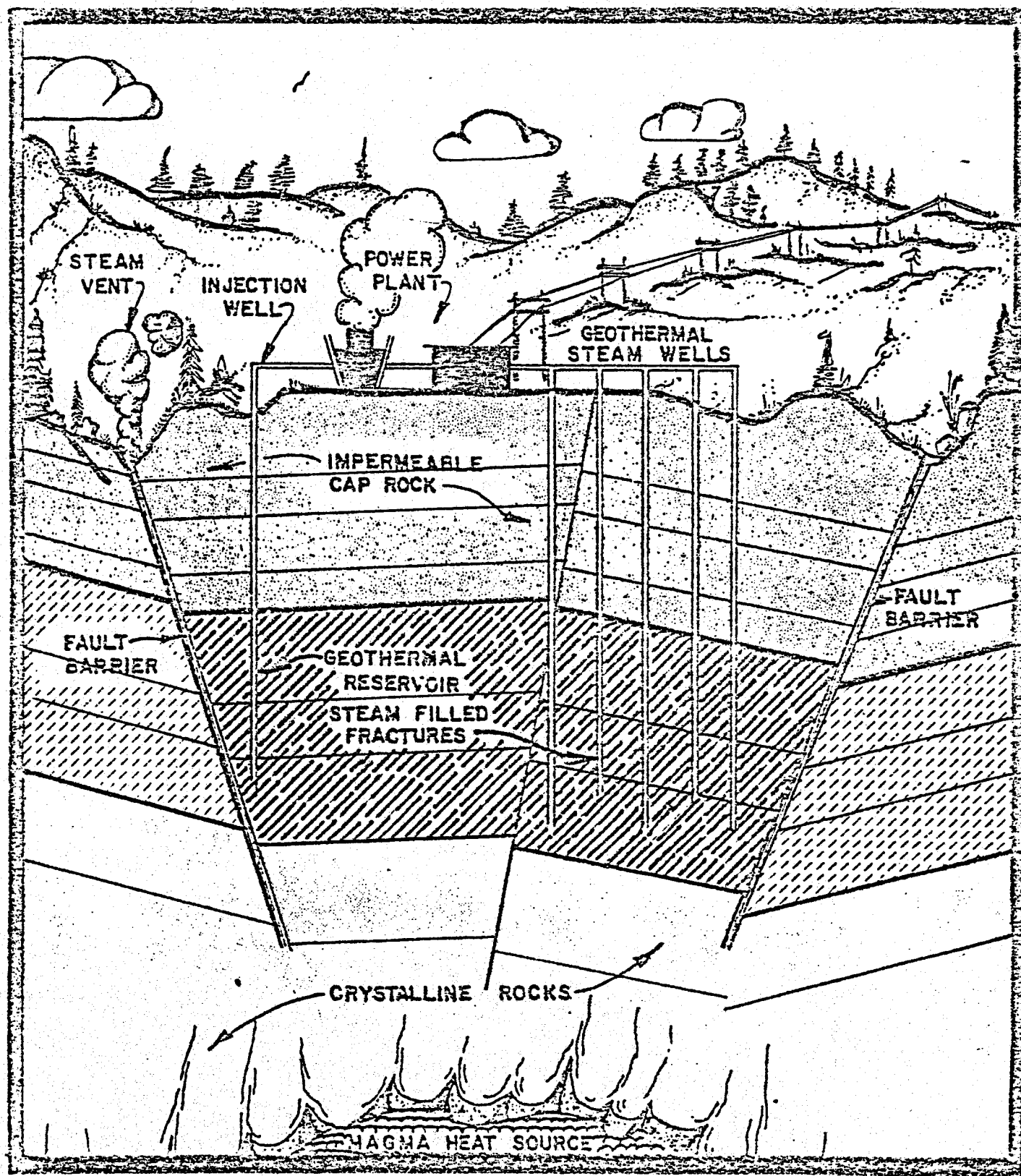
A large reservoir of geothermal steam exists in The Geysers Known Geothermal Resources Area (KGRA; see Figure 4). This natural resource is presently being used by PG&E to generate 502 MW of electric power. Four units representing another 400 MW of generating capacity are under construction. In addition 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 by local authorities 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, and one well has been drilled from the Coleman pad.

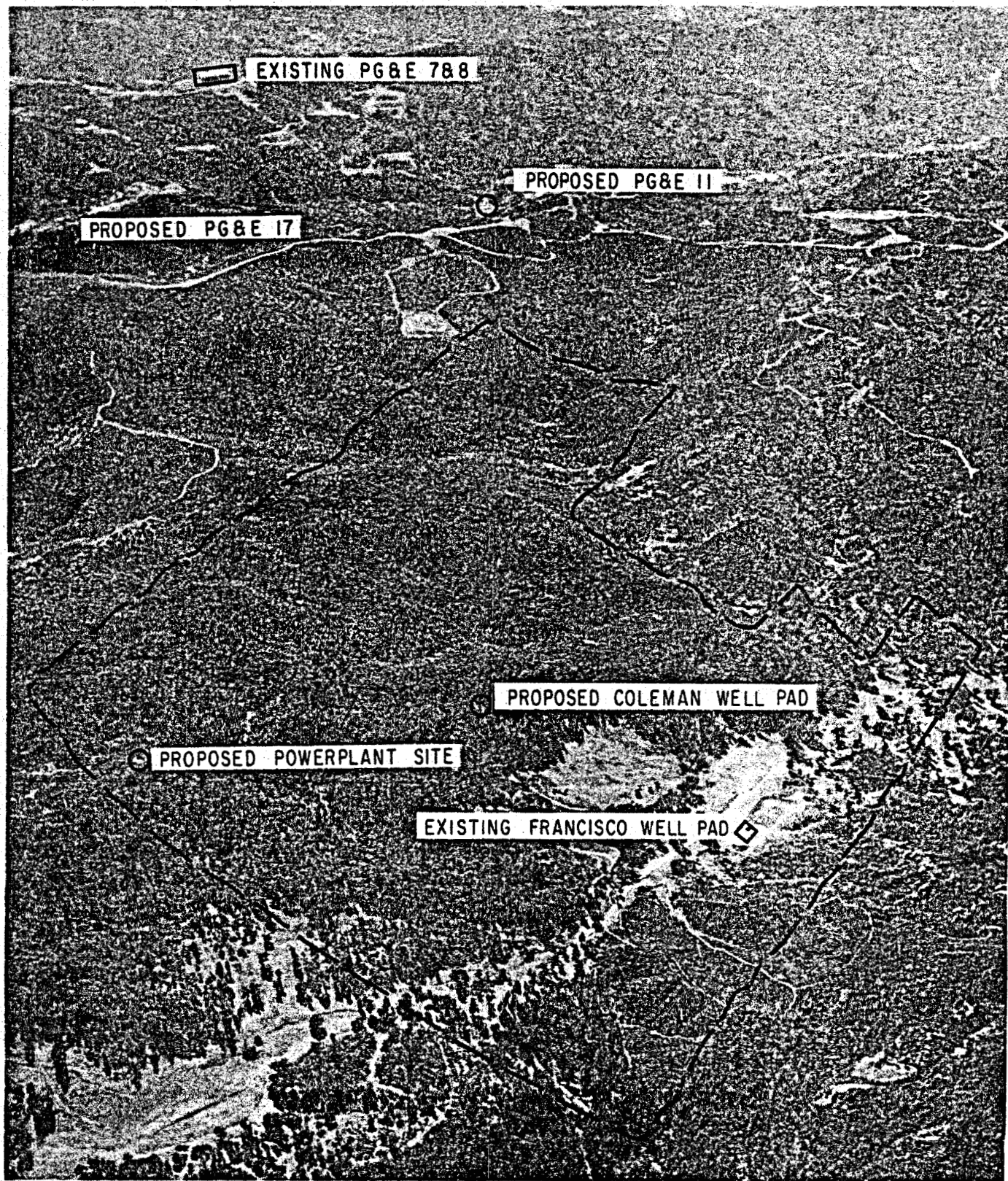
The Committee ordered the Applicant to submit a report on the status of the Lake County conditional use permits required for the steam wells. DWR's response was included in Appendix G of the Preliminary Report. At the May 4 hearing, a representative of Lake County clarified that only exploratory permits have thus far been issued to McCulloch, the steam developer.

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:



SIMPLIFIED GEOTHERMAL FIELD



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

ORIGINAL SOURCE:
BOTTLE ROCK NOI

MAP 3

<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

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.

*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. The Committee intends that this formal position will be adopted before the conclusion of AFC proceedings on this project.

2. Petitions to Intervene

At the date of publication of the Preliminary Report, March 26, 1979, no members of the public, public agencies, or other persons or groups had 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.

On April 28, 1979, the County of Lake petitioned the Committee for leave to intervene. At the Preliminary Report hearing on April 23, a representative of the County affirmed the County's desire to intervene in order to more fully address various socioeconomic concerns. The Applicant and the steam supplier questioned the need for the County's intervention at such advanced stage in the NOI proceedings. The County, however, stated that it did not wish to delay the proceedings, that its concerns were mitigable, and that these concerns should not prevent approval of the NOI. The Committee directed the Applicant and Staff to meet with the County regarding its concerns and possible mitigation measures, and to submit a report covering these matters at the May 4 evidentiary hearing. The Committee granted Lake County's petition to intervene on April 27, 1979.

Other than the County of Lake, the local Air Pollution Control District, several members of the public, the Applicant, and the Commission staff who commented verbally at the Preliminary Report hearing (see Appendices B, C, D, and E), only one other state agency has submitted comments on the Preliminary Report.

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; geology/seismicity 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 the Preliminary Report and this Final Report except for Need/Demand Conformance, Air Quality, and Geology/Seismicity. The Joint Statement was made available to the public on December 29, 1978.

At the suggestion of the Committee, the Staff also held a public workshop in Lakeport on May 2, 1979 in order to address the socioeconomic concerns raised by Lake County at the April 23 hearing on the Preliminary Report.

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. Appendix B of the Preliminary Report contained concerns raised by the public at the informational hearing in Lakeport.

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 Geology/Seismicity 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-range exposure to low-level

concentrations of H_2S ; 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 further stated 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 indicated the basic procedures which would be followed at the evidentiary hearing regarding submitting evidence on both disputed and undisputed 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. First Evidentiary Hearing

The Committee conducted the first public evidentiary hearing on the Bottle Rock NOI 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

*For a more detailed discussion on this matter, see Section II.A of the Preliminary Report.

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; thus, the agency no longer wished to challenge the acceptability of the proposed site or to propose an alternative site (see Appendix E of the Preliminary Report); 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 of the Preliminary Report). The Committee, therefore, 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 discussed above. 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 took official notice of two prior Commission decisions and introduced relevant portions of these decisions 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 were contained in Section II of the Preliminary Report.

The Committee then proceeded to adjudication of the issue of "Public Health: health effects of long-range 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, was contained in Section IV.B. of the Preliminary Report.

Finally, the Committee proceeded to adjudication of the Geology/Seismicity (formerly "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, was contained in Section IV.C.5 of the Preliminary Report (the "Geotechnical" section).

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

No party, participant, agency, or member of the public objected to, challenged, or substantially questioned the Committee's proposed Findings or Conclusions on the areas of Public Health, Geology/Seismicity, or Need/Demand Conformance. The Committee has therefore adopted these, with minor modifications, as final Findings and Conclusions in this Final Report. After consideration of comments submitted by the Commission staff and the evidence of record on the area of Need, the Committee has adopted certain changes in its final Findings and Conclusions. For a more complete discussion, see Section II.B.1., following.

7. Hearing on the Preliminary Report

On March 26, 1979, the Committee issued the Preliminary Report and a notice that a hearing on that Report would be held on April 23, 1979, in Lakeport. The Committee also set April 26, 1979 as the deadline for submitting comments on the Preliminary Report. During the April 23 public hearing, no party, participant, public agency, or member of the public requested the Committee hold further evidentiary hearings to address any issue adjudicated prior to issuance of the Preliminary Report, or to adjudicate any other issue. As discussed in Section I.C.2. of the Final Report, preceeding, no comments received at this hearing from either the parties, the County of Lake, the Air Pollution Control Officer, other public agencies, or the public indicated the need for further adjudicatory hearings.

However, on April 24, 1979, the Committee issued a Notice of Second Evidentiary Hearing and Hearing Order. This notice and Order scheduled a second evidentiary hearing for May 4, 1979, in Sacramento, for the purpose of formally receiving testimony and statements of position from the Staff and the Applicant into the evidentiary record concerning the actual or likely conformance of the proposed project with applicable local, regional, state, and federal standards, ordinances, and laws, as well as to formally receive supplementary testimony from the Staff concerning the areas of Cultural Resources and Socioeconomics. The Committee also directed the Applicant and the Staff to report on the status of any mitigation measures proposed to satisfy Lake County's concerns in the socioeconomic area. Finally, Applicant was ordered to provide any further information, not contained in its initial submission (Appendix F of the Preliminary Report), dealing with the status of transmission (wheeling) negotiations.

8. Second Evidentiary Hearing

The second public evidentiary hearing in the Bottle Rock NOI proceeding was held on May 4, 1979, in Sacramento.

At this evidentiary hearing, both the Applicant and the Staff formally stated their respective positions, accompanied by offers of proof subject to the opportunity for challenge, rebuttal, and/or cross-examination, regarding actual or likely compliance of the proposed project with applicable local, regional, state, and federal standards, ordinances, and laws. The County of Lake, as a party to these proceedings, also offered testimony regarding the conformity of the proposed project with local land-use plans. The Applicant and Staff proposed additional Findings and Conclusions, supported by appropriate offers of proof,

on the "Cultural Resources" aspect of the project for Committee consideration. Finally, the Applicant and the County of Lake offered Findings and Conclusions on the socioeconomic impacts of the proposed project. These proposed Findings and Conclusions were supported by oral testimony, which was subjected to cross-examination.

The Committee afforded all present an opportunity to object, question, and/or comment upon each offer of proof and position asserted. Although the County queried Staff over certain aspects of its written testimony, and both Staff and Applicant cross-examined the County's witness, no one present contested the basic positions asserted by the Applicant, the Staff, or the County, or attempted to exclude testimony offered into evidence.

The evidentiary record was then held open until May 11, 1979 for the limited purpose of receiving a signed version of one of Staff's declarations into the evidentiary record. No one objected, and the verified declaration was submitted on May 11, 1979.

D. Conformity with Applicable Standards, Ordinances, and Laws

The Committee is required by Public Resources Code Section 25514(a)(2) to include Findings and Conclusions in this Report on the conformity of the proposed site and related facility with "[a]pplicable local, regional, state, and federal standards, ordinances, and laws including any long-range land use plans or guidelines adopted by the state or by any local or regional planning agency...".

In furtherance of this mandate, the Committee had identified, in Appendix I of the Preliminary Report, the standards, ordinances, and laws tentatively deemed applicable to the proposed project. The Committee has also

actively solicited comments concerning conformity from responsible governmental entities, as well as directing the parties to state their respective positions concerning conformity. The question of conformity is discussed following each set of Findings and Conclusions on a particular topic in this Report.

II. CONFORMITY TO DEMAND FORECASTS

A. Need for Additional Generating Capacity

1. Introduction

Public Resources Code Section 25514 requires the Committee to determine the degree to which each alternative site and related facility proposal designated in the Notice or presented at a hearing and considered by the Commission is in conformity with the forecast of statewide and service area electric power demands adopted pursuant to PRC 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. 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).

3. Previous Disagreement

As explained at length on pages 20-26 of the Preliminary Report, the Staff and the Applicant initially exhibited a significant degree of disagreement concerning the area of "Need" in general, and concerning DWR's need for the capacity from the proposed project in particular. The Staff did, however, acknowledge DWR's ultimate need for the energy from the proposed project.

In the Preliminary Report the Committee proposed Findings and Conclusions on this area which were variations from those originally proposed solely by the Applicant or by the Staff. The Applicant expressed its agreement with the Committee's preliminary Findings and Conclusions; the Staff expressed its basic concurrence with these same Findings and Conclusions, but also submitted reasons and explanations why certain language in them should be changed (Commission Staff "Responses to the Committee PRELIMINARY REPORT"*, April 27, 1979).

B. Committee Findings and Conclusions

Overall, no one has challenged or objected to the substance of the Findings or Conclusions on NEED/DEMAND CONFORMANCE appearing at pages 27-30 of the Preliminary Report, either in written comment or during the course of hearings conducted after publication of that Report. In summary, the Staff's and the

*Hereinafter "Staff Responses."

Applicant's position is that the energy from the proposed project is needed. Moreover, the evidentiary offerings by the Applicant and the Staff during the course of the first evidentiary hearing are sufficient to persuade the Committee that its Findings and Conclusions, as contained in this Final Report, are well founded. The Committee has also examined the Staff Responses on the area of NEED/DEMAND CONFORMANCE and has incorporated various suggestions where appropriate. An explanation of these changes is included in subsection II.B. 1, following.

The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

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.
2. The Bottle Rock power plant will have a net generating capacity of about 55 megawatts.
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.
4. The Bottle Rock project is included in the Applicant's resource plan for 1983.
5. The Applicant needs electrical capacity and energy in order to meet the pumping requirements of the State Water Project (SWP).
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).
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.
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.
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.
10. 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.
11. 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.
12. 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.

13. The policy of the California Energy Commission is to encourage the accelerated development of geothermal resources.
14. Geothermal power plants have a relatively short construction lead time, relatively high annual capacity factor, and provide for potential fossil fuel savings.
15. 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 15.
2. If constructed and operated in compliance with applicable standards, ordinances, and laws, a geothermal power plant would be an acceptable means of supplying 385 Gwh of energy based on an 80 percent capacity factor 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

The Committee has deleted proposed Finding Number 10 which appeared in the Preliminary Report. This action was taken because of Staff comments demonstrating certain apparent discrepancies in DWR's estimate of reserve margins in the Sundesert proceedings and in the March 1978 CFM II forecast (see Appendix E). The Committee does not view this action as necessarily prejudicial to DWR, nor does Staff assert that such would be the case. The Finding originally appearing in the Preliminary Report has been deleted merely to obviate the contention, should the matter arise in the AFC or the Biennial Report II proceedings, that the issues of reserve margins or capacity requirements have been foreclosed to further comprehensive review. The Committee does not intend, however, that such deletion be construed as impairing the acceptability of the NOI.

The Committee has not, however, deleted Finding Number 11 of the Preliminary Report, which appears above as Finding Number 10. The Staff Responses state that the AB 1852 studies "... were not intended to definitely determine DWR's capacity requirements". However, in the Committee's estimation, present Finding Number 10 does not necessarily definitively determine DWR's capacity requirements, but merely restates Commission recognition of geothermal development as a viable source of replacement power for DWR. No reason therefore exists for deleting the Finding.

Finally, the Committee has adopted the technical clarifications submitted by Staff regarding Conclusion Number 2.

2. Conformity with Applicable Standards, Ordinances, and Laws.

In Appendix I, Category VII of the Preliminary Report, the Committee identified the following as being tentatively applicable to the proposed project regarding the issue of "Need":

Public Resources Code Section 25309 (Findings 5-15, Conclusion 2; this being conformance with the Commission's most recently adopted demand forecast).

At the second evidentiary hearing, the Applicant submitted written testimony supporting its position that the proposed project complies with the applicable law. The Staff also stated its position regarding the "Need" area, and submitted written testimony to the effect that energy from the proposed project is ultimately needed and that it is therefore reasonably likely that the proposed project will comply with applicable law governing this area. No one has raised any objections or substantially challenged the position of either party.

The weight of the evidence therefore leads the Committee to conclude that the proposed project complies with applicable law, for the purposes of the NOI, insofar as the area of "need" is concerned.

III. SITE RELATED ISSUES

A. Introduction

In addition to determining the degree of conformity with applicable standards, ordinances, and laws, Public Resources Code Section 25514 requires that a Final 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 of the Preliminary Report, 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 first 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, 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. With the exception of the topics of "Air Quality" and "Socioeconomics", these Findings and Conclusions are virtually the same as those which appeared at pages 39-80 of the Preliminary Report.

*Staff's and Applicant's prepared responses were set forth in Appendix E of the Preliminary Report.

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.* In this regard, the Commission staff has stated that it intends to give "great weight" to the judgment of the local Air Pollution Control Officer in making any recommendations on the air quality acceptability of the proposed project and would, in essence, accede to the determination made by the APCO unless such determination is "clearly erroneous" (Staff Responses, April 27, 1979, p. 1; see Appendix E). 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 DWR 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) regulations remains unsettled. The Committee understands that federal, state, and local authorities

*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.

**Appendix F of this Report contains the ARB's recent suggestion regarding New Source Review.

are engaging in a series of conferences directed toward clarifying this issue*, among others. The final Findings and Conclusions thus take the 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 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).

*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. The Committee intends that a Commission policy on this area be adopted prior to conclusion of the AFC proceedings in this case.

- 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 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 The LCAPCO believes that high levels of H₂S abatement in the steam transmission line cannot be achieved through mechanical means alone. The LCAPCD 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 LCAPCD and steam developers are thus exploring the alternative of chemical abatement of H₂S emission in the steam transmission lines. The LCAPCD will adopt steam stacking rules after the degree of

*The staff report was actually submitted on May 24, 1979, and is included as Appendix F of this Final Report.

abatement is determined (January 9, 1979 Transcript, pp. 222-4, 234-5).

- o LCAPCD 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).

c. Additional Clarification

In its April 27 Responses, the Commission staff clarified the impact of the ARB model New Source Review Rule upon the Lake County Air Pollution Control District as follows (Staff Responses, p. 2; see Appendix E):

"... Lake County is an attainment area for all pollutants which are subject to federal standards. Since the ARB model rule is a model for local NSR [New Source Review] rules which are to be included in the SIP [State Implementation Plan] for areas which do not attain federal standards, the Commission Staff considers it unlikely that the ARB model rule will be adopted for Lake County. Accordingly, Section 602 of the Rules and Regulations of the Lake County APCD, and not the ARB model rule, should be the NSR rule which is applicable to the Bottle Rock project, and which the Committee should use in its evaluation of this project." [emphasis in the original].

The Committee acknowledges this clarification and directs the reader to Air Quality Findings Number 7 and 8 and Conclusion Number 2 dealing with this matter.

3. Committee Findings and Conclusions

The Applicant, Staff, and LCAPCO have all stated that the Air Quality Findings and Conclusions, appearing at pages 39-47 of the Preliminary Report, were, with only minor modifications, proper, correct, and acceptable. The Committee therefore adopts the following Findings and Conclusions for the purposes of this Final Report:

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 percent, 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 H_2S is 0.03 ppm. This standard may not be equaled 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 Number 9 for the purposes of demonstrating compliance with applicable LCAPCD Rules. Once this analysis is completed, the APCD and the Committee shall determine whether H_2S emissions from the Bottle Rock plant will result in a violation of, or measurable contribution to the existing violation of, the H_2S 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 a 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, the Staff has submitted 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 percent to meet the 100 g/MWh limitation and by better than 98 percent 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 currently scheduled to begin operation in mid-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 H₂S emissions limitations as specified in Finding Number 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 H₂S emissions limitations as specified in Finding Number 22 at the Bottle Rock plant, or if sufficient data from Unit 15 is not available, at the time of the AFC filing.

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 H₂S abatement in order for H₂S 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 H_2S . Hence, PSD rules would not apply to these other pollutants.

30. The LCAPCD has recently adopted H_2S 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 APCD 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 has reported to the Committee as specified in Finding Number 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.

a. Points of Clarification

The most significant change in the foregoing Findings and Conclusions involves the addition, at DWR's suggestion, of the final phrase in Finding Number 25(b) for the purpose of clarification (see Appendix D). Staff did not object to this addition.

At the April 23 hearing on the Preliminary Report, the LCAPCO stated that the proposed Findings and Conclusions were "acceptable" to the District (see also Appendix C). The LCAPCO also offered the following definition relevant to Finding Number 11:

"...the District defines a 'basin wide air quality benefit' as a benefit that is demonstratable in the area potentially impacted by the proposed project, as well as elsewhere in the basin."

Second, regarding steam stacking, a research and development program to develop chemical abatement for steam transmission lines has not yet been formally initiated. The LCAPCD had proposed such a program in January 1979 which would involve participation of all steam developers in the Geysers. DWR and its steam supplier, McCulloch Oil, have apparently commenced their own steam transmission line chemical abatement program. The Staff understands that work on this alternative system is sufficiently advanced that, during the AFC, the Commission should be able to evaluate the ability of this system to achieve required abatement levels.

The LCAPCD also informed the Committee of the currently proposed steam stacking regulations:

"Steam Transmission Lines

- 1) In the event of a scheduled outage, effective Jan. 1, 1980, Hydrogen Sulfide emissions shall be reduced to no more than 25% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 4 hours from the time of outage.
- 2) In the event of a scheduled outage, effective Jan. 1, 1986, Hydrogen Sulfide emissions shall be reduced to no more than 10% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 4 hours from the time of outage.
- 3) In the event of an unscheduled outage, effective Jan. 1, 1980, Hydrogen Sulfide emissions shall be reduced to no more than 25% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 5 hours from the time of outage.
- 4) In the event of an unscheduled outage, effective Jan. 1, 1986, Hydrogen Sulfide emissions shall be reduced to no more than 10% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 5 hours from the time of outage."

b. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix I, Category I of the Preliminary Report, the Committee identified certain standards, ordinances, and laws as tentatively being applicable to the proposed project insofar as the area of "Air Quality" was concerned.

At the second evidentiary hearing, the Applicant stated its position and submitted testimony and accompanying documents supporting its position on the proposed project with respect to the air quality area. The Staff also stated its position, and submitted written testimony supporting such position and its opinion regarding conformity of the proposed project with applicable standards, ordinances, and laws governing this subject area. A summary of the parties' positions regarding conformity follows:

<u>Standard, Ordinance, or Law</u>	<u>Applicant Position</u>	<u>Staff Position</u>
a) LCAPCD Sec. 421.2 A (2) (applicable to Authority to Construct issued on or after 1-1-79) 100 grams/gross megawatthour (g/GMh) of hydrogen sulfide (H_2S). [Findings 13,14,30,31]	Information will be provided at AFC filing. Applicant believes reasonable likelihood of compliance.	Reasonable likelihood that project can comply; further information needed.
b) LCAPCD Sec. 421.2 A (4) (applicable 1-1-90) 50 g/GMh H_2S . [Finding 18]	Rule to be confirmed in 1987; same as (a) above.	Same as (a) above.
c) LCAPCD Sec. 411, limits emissions of particulate matter to the lesser of: 0.2 grain per cubic foot, or 40 lb/hr from a source with a process rate of 60,000 lb/hr. [Findings 1,2,3,13,14]	Power plant will comply. Steam stacking conditions will be within compliance. Information will be provided at AFC filing.	Same as (a) above.

<u>Standard, Ordinance, or Law</u>	<u>Applicant Position</u>	<u>Staff Position</u>
d) LCAPCD Sec. 412 (limits emissions from sulfur recovery unit producing elemental sulfur to: 10 ppm H ₂ S by volume; 100 lbs/hr of sulfur compounds calculated as SO ₂ . [Findings 4,5,13,14])	Complies; further information at AFC.	Same as (a) above.
e) NSCAPCD Rule 455(b) [Findings 10,11,12]	Applicability Uncertain.	Same as (a) above.
f) LCAPCD Sec. 602, 604 new source may not be expected to result in violation or measurable contribution to the continued violation of any local, state or national ambient air quality standard. [Findings 9,11,13,14]	Reasonable likelihood of compliance. Information will be provided at AFC filing.	Possible difficulty complying.
g) NSR Rules proposed by ARB. [Findings 16-27]	Cannot determine at this time.	Will not apply.
h) EPA Prevention of Significant Deterioration for H ₂ S. [Findings 28,29]	BACT will be used.	Can comply by use of BACT, which will be determined at AFC.
i) Federal New Source Review, applies to new source which emits 100 ton/yr of pollutant for which there is National Ambient Air Quality Standard. [Findings 3,7,8]	Same as (c) above.	Same as (a) above.
j) LCAPCD Sec. 430, limits discharge of contaminant to amounts in Table of Standards. [Findings 6,12,13]		

<u>Standard, Ordinance, or Law</u>			<u>Applicant Position</u>	<u>Staff Position</u>
<u>Substance</u>	<u>Concentration</u>	<u>Av. Period</u>		
Sulfur Dioxide	0.5 ppm 0.04 ppm	1 hr 24 hrs	Will comply.	Same as (a) above.
Visibility Reducing Particles	In sufficient amt. to reduce visibility to less than 10 miles when relative humidity is less than 70%	1 Observation	Will comply.	Same as (a) above.
Suspended Particulate Matter	60 ug/m ³ 100 ug/m ³	Annual Geometric Mean 24 hrs	Will comply.	Same as (a) above.
H ₂ S [Findings 12,13]	0.03 ppm	1 hr	Reasonable likelihood of compliance. Information will be provided at AFC filing.	Same as (f) above.
Sulfates	25 ug/m ³	24 hrs	Will comply.	Same as (a) above.

In its April 27 Responses, the Staff stated that the Findings and Conclusions contained in the Preliminary Report [and in this Final Report] represent the "most up-to-date assessment" of the ability of the proposed project to conform with applicable air quality standards. Furthermore, despite the lack of certainty in this area, the Staff does not view the air quality requirements as an absolute constraint to the construction of the proposed Bottle Rock project. Conclusion Number 7 takes the uncertainty surrounding this area into consideration.

In light of the above, the evidentiary offerings and other statements of record including those by the LCAPCO, and the fact that no one has challenged the position of either party as set forth above, the Committee

concludes that there is a reasonable likelihood that the proposed project will comply with the standards, ordinances, and laws set forth above. While an ultimate determination must await further information as noted in the Findings and Conclusions, the Committee is persuaded that likelihood of compliance has been adequately shown for purposes of the NOI.

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 first evidentiary hearing (January 25, 1979 Transcript, pp. 281-94).

With the exception of the Biological Resources area, no one substantially challenged or objected to these Findings and Conclusions prior to issuance of the Preliminary Report. As noted in various sections and explained in Section III.C.3. of the Preliminary Report, the Department of Fish and Game initially questioned the suitability of the proposed location for the power plant at the Prehearing Conference. At the first evidentiary hearing, however, DFG withdrew their objections and expressed affirmative support for the proposed

power plant location, and for the proposed Joint Findings and Conclusions as amended at the Prehearing Conference.

On April 18, 1979 the County of Lake petitioned the Committee for leave to intervene in these proceedings, expressing concerns about the issue of "Socioeconomics" as presented in the Proposed Findings and Conclusions contained in the Preliminary Report. At the April 23 hearing, the County elaborated upon its concerns, and several members of the public also commented upon the validity of these concerns.* The Committee granted Lake County's petition to intervene on April 27, 1979.

3. Committee Findings and Conclusions

With the exception of the "Socioeconomics" area, no one has challenged or substantially objected to the Findings or Conclusions on the above-enumerated subject areas as they appeared at pages 51-81 of the Preliminary Report. The Committee therefore adopts these Findings and Conclusions for purposes of this Final Report.

The Staff submitted supplementary testimony on the areas of "Cultural Resources" and "Socioeconomics" at the second evidentiary hearing, held on May 4, 1979. In view of the evidence submitted at both evidentiary hearings, and in view of the comments and concerns raised at the Preliminary Report hearing, the Committee has changed the language of its final Findings and Conclusions on "Socioeconomics" and "Cultural Resources".

The Committee therefore adopts the following Findings and Conclusions on the above-mentioned nine subject areas:

*A more complete discussion of this matter is contained in Section III.C.13. of this Report, following.

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.

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 final 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 tie-line 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, empties 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 percent 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 generally 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 Number 12, 14, 18 and 22.

2. The Applicant shall provide the information specified in Findings Number 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.

4. Points of Clarification

The Preliminary Report, at pages 56-60, dealt with matters further explaining biological resources concerns, such as the actions of the Department of Fish and Game and a definition of the term "areas of critical concern". This narrative does not bear repetition here, but is nevertheless pertinent to the Final Report and Proposed Decision.

In its comments submitted on the Preliminary Report (Appendix E), the Commission staff elaborated upon the status of the generic proceedings, endorsed and encouraged by the Committee, referred to in Finding Number 24. The Staff has not yet met with interested agencies to develop an agenda for such proceeding, but feels that several key points should be addressed:

1. Cumulative impacts of geothermal development in the Geysers area;
2. Areas of biological importance;
3. Impacts, mitigation measures, and monitoring programs;
4. Further concerns such as effect of cooling tower drift on vegetation; siltation of fisheries; habitat loss.

The Committee agrees with Staff's opinion that "...addressing the generic issues associated with geothermal development in the Geysers will further future compatibility between existing biological resources and the development of geothermal resources."

5. Conformity with Applicable Standards, Ordinances, and Laws

The Committee identified, in Appendix I, Category II of the Preliminary Report, the following as tentatively applicable to the proposed project regarding the area of "Biological Resources":

- o Federal Endangered Species Act of 1973 and implementing regulations;
- o Ecological Reserve Act of 1968 and implementing regulations, Fish and Game Code sections 1580-84;
- o California Species Preservation Act of 1970, Fish and Game Code sections 900-903;
- o California Endangered Species Act of 1970, Fish and Game Code sections 2050-55;

- o Fully Protected Species Act, Fish and Game Code sections 3511, 4700, 5000, and 5515; and
- o Native Plant Protection, Fish and Game Code sections 1900-1913

At the May 4 evidentiary hearing, the Applicant submitted testimony supporting its position that the proposed project will comply with the above laws. The Staff also stated its position regarding the "Biological Resources" area, and submitted testimony that the proposed project has a reasonable likelihood of complying with the above laws. No one has seriously contested the position of either party.

The weight of the evidence therefore leads the Committee to conclude that there is a reasonable likelihood that the proposed project will comply with applicable laws. A final determination depends upon evaluation of proposed mitigation measures, which will be done during the AFC.

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.

6. Point of Clarification

The Committee concurs with Staff's comment that the concerns raised by the State Solid Waste Management Board and appearing at page 80 of the Preliminary Report are more appropriate to this topic area.

7. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix I, Category III of the Preliminary Report, the Committee identified the following standard as tentatively being applicable to the area of "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)

Testimony submitted by the Staff and by the Applicant at the second evidentiary hearing indicates that the proposed project will comply with the above standard. No challenge or objection has been raised to this assessment, and the Committee therefore concludes that the proposed project could be constructed and operated in conformity with identified Civil Engineering and Solid Waste Management standards.

The Committee is aware that the Department of Health Services has stated (see Appendix C) that the following laws also apply to this subject area:

Health and Safety Code, Sections 25100 et seq.; Cal Admin. Code, Title 22, Sections 60102 (new 66028) et seq.--Findings 6-8; Conclusion 3).

The Committee directs that the Staff and Applicant respond to the appropriateness/applicability of this particular standard during the AFC proceeding. Since the Department of Health's comments indicate that the proposed project "will comply" with law and regulations concerning hazardous waste disposal (see Appendix C), the Committee need not definitively determine the applicability or non-applicability of the above standard for purposes of the NOI.

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 Number 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 undertaken additional studies to determine the significance of these resources. The Applicant has provided a report to the Commission detailing the results of those studies.

7. The Applicant has also agreed to take interim mitigation measures, a description of which it has supplied 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, was submitted to the Commission. 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 Number 5 and 8.

2. 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.

3. No adjudication of this issue is necessary during the NOI.

8. Points of Clarification

The proposed Findings and Conclusions on the "Cultural Resources" topic appeared at pages 63-64 of the Preliminary Report. The Committee has changed the language of Findings Number 6 and 7 to reflect submission of additional information by the Applicant, in conformity with proposed changes submitted by Applicant and by Staff, and has deleted former Conclusion 2 (see Appendices D and E). The Staff is currently evaluating the information submitted, in accordance with this Conclusion as it appeared in the Preliminary Report.

9. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix I, Category IV of the Preliminary Report, the Committee identified the following laws as tentatively applicable to the proposed Bottle Rock project:

- o National Historic Preservation Act of 1966, 16 U.S.C. 470 et seq., 36 CFR 800
- o Native American Historical, Cultural, and Sacred Sites, Public Resources Code sections 5097.9 et seq.

Both Applicant and Staff submitted testimony at the second evidentiary hearing which indicated that the proposed project has a substantial likelihood

of complying with the applicable laws pertaining to this topic. No one challenged or objected to this position. The Committee therefore concludes that there is a substantial likelihood that the proposed project would comply with laws applicable to the "Cultural Resources" area.

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.

10. Conformity with Applicable Standards, Ordinances, and Laws

As noted in Appendix I, Category VI of the Preliminary Report, there are no specific standards, ordinances, or laws relating to the topic of

"Hydrology". As noted in the Findings and Conclusions, however, Staff's evaluation leads to the conclusion that the proposed facility is adequately protected from stream and overland flooding; final project design will be further evaluated during the AFC to ensure protection from spill-related flooding events.

The written testimony and statements of position offered by both the Applicant and Staff during the course of the two evidentiary hearings, and received into the record without challenge or objection, persuade the Committee that the proposed project is acceptable for the purposes of NOI regarding hydrological concerns.

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 Number 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.

11. Point of Clarification

Staff comments on the Preliminary Report clarify the matters referred to in Finding Number 13 and Conclusion Number 2, above (see Appendix E). The Applicant has provided data showing the noise emission level from PG&E's Geysers Units 7 and 8 and the measured noise attenuation curve. This data does not, however, demonstrate what the noise emission level from the proposed project will be. This specific information will be provided prior to or at the time of the AFC filing.

12. Conformity with Applicable Standards, Ordinances, and Laws

The Committee identified the following as tentatively applicable to the proposed project, regarding the topic of "Noise", in Appendix I, Category VIII, of the Preliminary Report:

- o Lake County General Plan, Noise Element
- o CAL-OSHA, 8 Cal. Admin. Code sections 5095-99 and Cal. Vehicle Code section 23120
- o Occupational Safety and Health Act of 1970

At the second evidentiary hearing, the Applicant submitted written testimony and accompanying documents supporting its position that the proposed project will comply with the above local, state, and federal standards. The Staff also stated its position regarding the area of "Noise", and submitted written testimony that it is reasonably likely that the proposed project will comply with the above standards.

No one has challenged the position of either party.

The weight of the evidence therefore leads the Committee to conclude, for the purposes of the NOI, that the proposed project will comply with standards, ordinances, and laws applicable to this project.

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 steam-field development.
2. The previous operations in the Geysers area have established a resident labor force in the Sonoma-Lake Counties 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 steamfield.
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. Staff and Applicant anticipate that the costs borne by local jurisdictions (in particular, Lake County) as a result of the construction and operation of the Bottle Rock project would be offset by tax revenues derived from the project.

8. The matter set forth in Finding Number 7 above has been supported by information provided by the Applicant 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.

9. The Applicant has provided information on the availability of housing in the vicinity of the plant site, and the Applicant and Staff anticipate that adequate housing will be available in Lake County to accommodate those workers who move into the vicinity of the project site during project construction.

10. Lake County does not necessarily agree with the matters stated in Findings Number 7 and 9 above.

11. The proposed power plant is located between an area whose principal land use is the exploration, development, and utilization of geothermal energy and which has numerous geothermal power plants in operation, and an area whose principal land use is residential, recreational, and geothermal exploration. 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 compatibility of the proposed project with local land use plans, goals, and policies.

13. The County of Lake petitioned to intervene on April 18, 1979, after the issuance of the Committee's Preliminary Report. The County's petition was based on the fact that it had concerns with the socio-economic impacts resulting from the proposed Bottle Rock Plant. The County specifically believes that the construction and operation of the Bottle Rock Power Plant will impact the County roads to a greater extent than reflected in the Commission Committee's Preliminary Report.

14. It is anticipated that the activities associated with construction and operation of the Bottle Rock Power Plant could adversely impact Lake County roads.

15. The Applicant and Lake County shall meet in an attempt to resolve the County's socioeconomic concerns. The Applicant shall submit a status report on the progress of these negotiations, specifying which concerns have been resolved and which matters remain in dispute, prior to or at the filing of the AFC.

Conclusions

1. Due to the present resident labor force in the Sonoma-Lake Counties area, the Bottle Rock project should 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 may be sufficient to offset the project-related costs borne by local jurisdictions.

3. Adequate housing may 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. 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 the NOI.

6. The Department and the County have agreed to negotiate mitigations, consistent with State law, for any agreed upon socioeconomic impacts. Should the County and the Department be unable to reach an agreement, the County will have the opportunity to intervene and present formal testimony in the AFC with regard to socioeconomics.

7. No adjudication of this issue is necessary during the NOI.

13. Points of Clarification

The above Findings and Conclusions are significantly different from those which appeared at pages 72-74 of the Preliminary Report. The Committee has changed the language of Findings Number 7 and 9, and added Finding Number 10 above, to reflect the fact that Lake County has raised concerns involving the costs which would be borne by the local jurisdictions and the availability of housing in the vicinity of the proposed project. Findings Number 11, 12 and 14 above reflect proposed additional language submitted jointly by DWR and Lake County at the second evidentiary hearing. The Committee has also added Finding Number 15 in order to prompt expeditious and fruitful negotiations between the Applicant and the County. The Conclusions, especially Numbers 5 and 6, have also been amended to reflect that negotiations are ongoing, and that the issue of socioeconomics is not foreclosed in the AFC.

Oral testimony offered on behalf of the Applicant and the County at the second evidentiary hearing supports the Findings and Conclusions proposed by these two parties. Although the County specifically questioned certain aspects of Staff's written testimony, no party indicated that the socioeconomic impact issues were not amenable to informal resolution, nor that the NOI proceedings could not be concluded.

Though the County of Lake's primary reason for intervening in these proceedings is founded upon socioeconomic concerns, and although both favorable and unfavorable comments on the proposed project (see Appendices B and C) were received at the April 23, 1979 hearing on the Preliminary Report and at the second evidentiary hearing, neither the County nor any commentor indicated that the concerns were sufficient, at this time, to require disapproval of the NOI. The universal opinion was that the various concerns are in fact mitigable.

The Applicant and the Staff have met, and will meet, with Lake County in an attempt to resolve valid socioeconomic concerns. The Committee hopes that amicable resolution can be reached; should, however, justiciable issues remain, the Findings and Conclusions provide that the issue may be raised in the AFC.

14. Conformity with Applicable Standards, Ordinances, and Laws

The Committee did not identify any codified standards applicable to "Socioeconomics" in Appendix I of the Preliminary Report. Staff, however, suggested that the following standards apply:

- o Lake County General Plan (Open Space, Conservation Element)
- o Lake County Conditions, Procedures and Performance Standards for Geothermal Regulations

o Lake County Zoning Ordinances

Written testimony submitted on behalf of the Applicant at the second evidentiary hearing indicates that there are in fact no adopted standards applying to the socioeconomic area. Staff testimony, including a supplementary position paper submitted at the second evidentiary hearing, indicates that the above-mentioned standards and ordinances apply.

Oral testimony offered on behalf of Lake County at the second evidentiary hearing by a member of the Planning Commission indicated that the County has no geothermal element in its General Plan. This Plan, and the Standards for Geothermal Regulation referred to above are currently being revised; until such revisions are adopted however, the existing standards and ordinances will apparently remain in effect. The Planning Commissioner's testimony, which was qualified as not necessarily representing the views of the Board of Supervisors, further indicated that:

- 1) The proposed project is susceptible to mitigation measures sufficient to allow it to be sited where proposed; but
- 2) Such potential approval for the siting of one geothermal power plant should not be construed as reflecting an overall commitment to geothermal development.

A significant number of unresolved matters thus remains insofar as socioeconomic impacts are concerned. The Committee believes that Lake County Zoning Ordinances* would apply to the proposed project, as would the Standards

*Staff testimony indicates that the project site is in an area which is "unclassified" under the General Plan; testimony on behalf of Lake County indicates that "unclassified" means merely not yet zoned.

for Geothermal Regulation. In light of the testimony on behalf of Lake County that the General Plan has no geothermal element, this standard, at this time, would seem to be inapplicable.

In any event, the positions asserted by all three parties, DWR, Staff, and Lake County, are uniform in that the proposed project can be constructed and operated in such manner as to mitigate legitimate socioeconomic concerns and to comply with County standards and ordinances. Such showing is sufficient for purposes of the NOI, although further clarification and definition may be necessary during the AFC.

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 hydromulching 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 Number 3.

2. If the Applicant implements the mitigation measures specified in Finding Number 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 Number 4.

4. No adjudication of this issue is necessary during the NOI.

15. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix I, Category XII of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding the area of "Soils":

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.

At the second evidentiary hearing, the Applicant submitted written testimony supporting its position that any potential detriments to the soils in the vicinity of the proposed project would be adequately controlled, in compliance with the applicable standards. The Staff also stated its position and provided written testimony indicating that, while additional information is needed, there is a reasonable likelihood that the proposed project will comply with applicable soils standards. No one challenged the position of either party.

While a final determination of compliance with the applicable "Soils" standards cannot be made until the Applicant submits the additional information referred to in the Findings and Conclusions, the Committee concludes that the evidence is sufficient to demonstrate sufficient likelihood of compliance with Soils standards for purposes of the NOI.

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 Control Act
- b. California Regional Water Quality Control Plan-Sacramento River Basin (5a)
- c. Federal Clean Water Act (33 USC 1321)

d. "Waste Discharge Requirements for Non-Sewerable Waste Disposal to Land", January 1978, California State Water Resources Control Board.

e. US-EPA Quality Criteria for Water (1976)

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 steamfield. 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 Number 6, 7, and 8 above.

4. If the Applicant follows the proposals outlined in Findings Number 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.

16. Points of Clarification

At Staff's suggestion, the Committee has included item "e" in Finding Number 5 as a criterion relevant to this topic.

Furthermore, a letter from Union Oil dated March 12, 1979 and docketed in this proceeding, indicates that reinjection has not increased H₂S concentrations in the steam field.

17. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix I, Category XV of the Preliminary Report, the Committee identified the following as tentatively applicable to the area of "Water Quality":

- o Porter-Cologne Water Quality Control Act;
- o California Regional Water Quality Control Plan, Sacramento River Basin (5A);
- o Federal Clean Water Act, 33 USC 1321;
- o "Waste Discharge Requirements for Non-Sewerable Waste Disposal to Land", January 1978, State Water Resources Control Board

As mentioned above, the Committee has also included "U.S. EPA-Quality Criteria for Water (1976)" as an applicable guideline.

At the second evidentiary hearing, the Applicant submitted written testimony supporting its position that the proposed project would comply with the above water quality standards. The Staff also stated its position and submitted written testimony indicating that there is a reasonable likelihood that the proposed project will comply with the applicable standards. No one objected to the position of either party.

While a final determination of compliance with water quality standards cannot be made until the additional information referred to in the Findings

and Conclusions is submitted, the Committee concludes that the evidence is sufficient to demonstrate a reasonable likelihood of compliance with water quality standards for purposes of the NOI.

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.

18. Conformity with Applicable Standards, Ordinances, and Laws

No standards, ordinances, or laws were identified pertaining to the topic of Water Resources in the Preliminary Report. The Committee is, however,

persuaded by the evidence of record offered by the Staff and by the Applicant, the State Department of Water Resources, that the proposed project would not adversely affect fresh water resources.

IV. PUBLIC HEALTH, SAFETY, AND RELIABILITY

A. Introduction

Public Resources Code Sections 25511 and 25514 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, and in the Preliminary 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 Geology/Seismicity, Structural Engineering, and Systems Engineering issues discussed in Section IV.C. Finally, the Committee, in Section IV.C., has also set forth Findings and Conclusions specifically dealing with the area of Reliability and Safety, as required by Public Resources Code Sections 25511 and 25514.

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 (see Preliminary Report, 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 appeared at pages 85-88 of the Preliminary Report.

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 were also discussed in the Preliminary Report and do not bear repetition here.

After conclusion of the first evidentiary hearing and following submission of the post-hearing Briefs, the Committee carefully considered the testimony proffered by Staff and Applicant and the arguments propounded on their respective positions. After evaluating the competing positions in light of the evidence of record, the Committee arrived at several conclusions regarding the disputed matters. These were set forth on pages 88-89 of the Preliminary Report.

*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).

3. Committee Findings and Conclusions

On pages 90-99 of the Preliminary Report, the Committee set forth proposed Findings and Conclusions dealing with all Public Health issues covered in the Joint Statement, as well as the issues which had been adjudicated during the first evidentiary hearing. In the course of proceedings following issuance of the Preliminary Report, no one has challenged or objected to these Findings and Conclusions and both the Staff and Applicant have, in fact, expressed affirmative support for all of them. The Committee therefore adopts the following Findings and Conclusions on "Public Health" for the purposes of this Final Report.

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. Based on 1974 report prepared by the Illinois Institute for Environmental Quality, an ambient air quality standard for H_2S of 0.01 ppm (8 hour average), intended to protect public health, was proposed for the State of Illinois. This standard has not yet been adopted and, at present, the State of Illinois does not have an ambient air quality standard for hydrogen sulfide.

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 Number 11.

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 Number 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 Number 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 (6×10^{-4} 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/m³. 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 the 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 Number 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 the Bottle Rock plant 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 Number 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 one-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 Number 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.

4. Points of Clarification

The Staff, in its comments of April 27, 1979, indicated that the phrase "if necessary" should be deleted from Finding 8 and Conclusion 2 under "Radionuclides" because of its belief that the Department of Health Services had already decided that a radon-222 monitoring program was in fact necessary. At the May 4 evidentiary hearing, the Applicant clarified, to Staff's satisfaction, that the necessity of such program had not yet in fact been decided, and reaffirmed its commitment to implement a suitable program when and if it is required.

The Committee has changed the language of Finding Number 7 under "Hydrogen Sulfide" to more accurately reflect the status of the proposed Illinois ambient H₂S standard.

5. Conformity With Applicable Standards, Ordinances, and Laws

In Appendix I, Category IX of the Preliminary Report, the Committee identified the following standards as tentatively applicable to the area of "Public Health":

- o H_2S - State Ambient Air Quality Standards [Findings 1-4; Conclusions 1-3];
- o Ammonia, Ammonium Compounds, Sulfates - California Occupational Safety and Health Standard for Suspended Sulfates [Findings 1-7; Conclusions 1-3*]; California Ambient Air Quality Standard for Suspended Sulfates [Findings 8-12].
- o Arsenic - National Institute for Occupational Safety and Health Standard [Findings 1-6; Conclusions 1-2*];
- o Mercury [Findings 1-11; Conclusions 1-3*];
- o Radionuclides - California Standard for ^{222}Rn , 17 Cal. Admin. Code 30355 [Findings 1-8; Conclusions 1-2];
- o Sulfur Dioxide - ARB Ambient Air Quality Standard [Findings 1-3; Conclusion 1];
- o TSP - ARB Standard [Findings 1-5; Conclusions 1-4].

*There are no enforceable standards for ammonia, arsenic, or mercury. There are, however, suggested public health standards for these substances, as well as industrial standards for ammonia, arsenic, and mercury. Therefore, the public health impacts of the emissions of these substances from the Bottle Rock project will be assessed in light of various proposed recommended standards.

At the second evidentiary hearing the Applicant and the Staff submitted written testimony supporting their positions that there was a reasonable likelihood that the proposed project would comply with applicable standards, ordinances, and laws. No one objected to this assessment.

Thus, while a final determination of conformity with applicable public health standards is dependent upon the additional information referred to in the "Public Health" Findings and Conclusions, and also upon certain information referred to the "Air Quality" Findings and Conclusions, the Committee is persuaded that a likelihood of compliance with applicable standards has, for the purposes of the NOI, been demonstrated.

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 25514 requires the Committee to include Findings and Conclusions in the Final 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 Findings and Conclusions on "Structural Engineering" and "Systems Engineering". The Committee has also included 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 first 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" were set forth at pages 102-11 of the Preliminary Report, and have been adopted for purposes of this Final Report.

These three areas are not, however, the only areas which relate to the reliability and safety of the proposed project; the area of "Geology/ Seismicity" 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. The Preliminary Report, at pages 114-28 (under the topic "Geotechnology"), contains a discussion of the proceedings regarding this issue.

2. Committee Findings and Conclusions

No one has challenged or objected to the Findings and Conclusions on the topics of "Structural Engineering", "Systems Engineering", or "Reliability and Safety" as they appeared in the Preliminary Report. The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

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 an 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 the 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 Number 3 and 9.

5. No adjudication of this issue is necessary during the NOI.

3. Conformity with Applicable Standards, Ordinances, and Laws.

The Committee identified, in Appendix I, Category XIII of the Preliminary Report, the following as tentatively applicable to the "Structural Engineering" aspects of the proposed project:

Uniform Building Code
(1976 Edition)
Titles 8, 24 of Cal.
Administrative Code

At the second evidentiary hearing, the Applicant submitted written testimony indicating that the proposed project will comply with applicable structural engineering standards. The Staff submitted written testimony indicating that, although a final determination of compliance cannot be made until after review of the AFC submittal and the information yet to be filed, the proposed project is nevertheless acceptable for purposes of the NOI. No one objected to either of these positions. Thus, though a final determination of conformity with applicable standards, ordinances, and laws must await the AFC, the Committee concludes that reasonable likelihood of conformity, sufficient for purposes of the NOI, has been shown.

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 Number 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 in 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 AFC, the unit is acceptable from the standpoint of systems engineering.
3. No adjudication of this issue is necessary during the NOI.
4. Conformity with Applicable Standards, Ordinances, and Laws.

There are no specific standards, ordinances, or laws pertaining to this topic. The Staff and Applicant have both stated their positions, and the Applicant has submitted written testimony in support thereof, that the proposed

project can be acceptably engineered. Absent any contrary indication, the Committee accepts the foregoing Findings and Conclusions, and the acceptability of the systems engineering aspects of the project, for purposes of the NOI.

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 percent (lifetime average), an availability factor of 90 percent, and a forced outage rate of 3.1 percent.

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 Number 4. The Committee understands that the Staff has provided this information to Applicant's satisfaction.

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.

5. Point of Clarification

Pages 112-113 of the Preliminary Report contain mutually acceptable definitions of the terms "availability factor", "capacity factor", and "forced outage rate".

6. Conformity with Applicable Standards, Ordinances, and Laws.

In Appendix I, Category X of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding "Reliability and Safety":

- o Fire Protection and Occupational Safety Regulations, Title 8, Cal. Admin. Code [Finding 7].
- o American Society of Mechanical Engineers Code (ASME Code) Section III, unfired pressure vessels [Finding 8].
- o ICC specifications 3 A or 3AA seamless steel cylinders [Finding 8].
- o Various unspecified ICC standards, and NFPA Codes [Finding 9].

At the May 4 evidentiary hearing, the Applicant submitted written testimony supporting its position that the proposed project will be able to comply with the above standards. The Staff submitted written testimony to the effect that there is a reasonable likelihood that the proposed project will comply with the laws applicable to this topic. No objections were raised to either offer of proof.

The Committee is therefore persuaded that sufficient likelihood of conformance with the applicable standards, ordinances, and laws has been shown for purposes of the NOI.

7. Geology/Seismicity*

a. Prehearing Conference

The Staff and the Applicant submitted separate Statements of Proposed Findings and Conclusions on the issue of Geology/Seismicity 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

*Referred to as "Geotechnology" at pages 114-28 of the Preliminary Report.

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.*

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. Committee Findings and Conclusions

As explained at pages 117-119 of the Preliminary Report, the Committee carefully considered the evidence adduced in the course of the first evidentiary hearing in arriving at the Proposed Findings and Conclusions set forth in that Report. No one has challenged or objected to those Findings and Conclusions. The Committee therefore concludes that this matter has been resolved, as reflected in the following Findings and Conclusions adopted for purposes of this Final Report:

*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 at pages 124-28 of the Preliminary Report.

FINDINGS AND CONCLUSIONS

,*GEOLOGY/SEISMICITY*

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.

d. Conformity With Applicable Standards, Ordinances, and Laws

As noted in Appendix I, Category V of the Preliminary Report, there are no adopted standards governing the acceptability of site seismic characteristics. The Applicant, at the May 4 evidentiary hearing, offered testimony that appropriate design criteria will be used. The Staff indicated its position that the proposed project can be constructed in accordance with acceptable seismic criteria. No one objected to either position. The Committee therefore concludes that a degree of geology/seismicity acceptability, sufficient for purposes of the NOI, has been shown.

V. ISSUES REQUIRING FURTHER REVIEW

A. Introduction

The first basis for identifying issues that will require further consideration in proceedings on DWR's proposal to construct and operate its Bottle Rock geothermal project lay in the Findings and Conclusions presented Preliminary Report and, to large degree, repeated in the foregoing sections of this Report. 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 full Commission approve the Notice of Intention. Except for additional information on "Cultural Resources" and "Socioeconomics" submitted after preparation of the Preliminary Report, 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, and especially as related to the area of Socioeconomics.

The preceeding Findings and Conclusions indicate that a portion of the area of "Hydrology" and the area of "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 Conformance", "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 has considered 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, should the full Commission approve the NOI.

Under these circumstances, and including information presented at the Preliminary Report and evidentiary hearings, the Committee has issued this 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 the hearing on the Final Report as to whether or not the NOI for the DWR Bottle Rock geothermal project should be approved, and as to whether the Proposed Decision contained in Appendix I should be modified.

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; 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, 25, 26, 27; Conclusions 5, 6).
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).
Geology/Seismicity	Exploratory work needed to determine proper treatment of seasonally wet area. ("Geology/Seismicity", Seasonally Wet Area, Finding 1; Conclusion 1).
Need/Demand Conformance	Verified and detailed data demonstrating the relative merit and cost comparison of purchase vs. self-generated power. ("Need/Demand Conformance," Findings 13, 15; Conclusion 1).

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

<u>Area</u>	<u>Information and Tasks</u>
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).
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, 9; Conclusion 2).
Socioeconomic Impacts	Applicant shall submit in status report dealing with Lake County's Socioeconomic concerns, and indicating the areas upon which agreement has and has not been reached.
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).

<u>Area</u>	<u>Information and Tasks</u>
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 the Preliminary Report;

b. Cumulative impacts of geothermal development on the biological resources of the Geysers area, as discussed in Section III.C.3. of the Preliminary 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 the Preliminary 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

*At present, PG&E has 12 units operating, three under construction, one (Unit 16) in the NOI stage, another (Unit 17) in the AFC stage, and one more (Unit 18) recently accepted on an expedited NOI/AFC filing; NCPA has one unit (No. 2) conditionally accepted in the AFC stage; DWR's Bottle Rock project could be certified by the end of 1979.

similar, proceeding,* conducted by the Commission. The Committee continues to urge 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 H_2S abatement system treats H_2S which reaches the system in the gas stream. The amount of H_2S which reaches the Stretford system is dependent upon the amount of H_2S which the surface condenser is able 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 Staff has informed the Committee that DWR's supply plan will be evaluated in the Biennial Report II proceeding, not specifically in a Generic Technology Assessment Proceeding.

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 is not available or indicates that the partitioning efficiency of the surface condenser is not sufficient to meet specified H_2S 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 H_2S emissions from the proposed project will result in a violation of, or measurable contribution to the existing violation of, the H_2S 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).

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. Geology/Seismicity

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. (Geology/Seismicity-Seasonally Wet Area, Finding 1).

6. Hydrology

a. Question: Is the proposed facility adequately protected from spill-related flooding events?

Information Required: The final project design will be reviewed during the AFC to determine whether the proposed facility is in fact adequately protected from spill-related flooding events. (hydrology, Finding 3; Conclusion 2).

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. The Applicant has provided noise emission data from PG&E's Units 7 and 8, but data specific to the proposed Bottle Rock project will be provided by the AFC filing. (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 plant 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: How shall the Socioeconomic impact concerns of Lake County be addressed?

Information Required: The Applicant has already submitted supplementary information on the costs to local jurisdictions occasioned by the proposed project and on the availability of housing in the vicinity of the proposed project for Staff review. There are, however, additional concerns raised by the County. Both DWR and Lake County have agreed to seek to informally resolve these matters. The Committee has required the Applicant to report on the status of its negotiations with the County at the time it files an AFC. Should significant legitimate socioeconomic concerns remain, formal resolution during the AFC proceedings may be appropriate.

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

APPENDIX A

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
Petition to Intervene - Lake County	April 18, 1979
Public Hearing on <u>Preliminary Report</u> - Lakeport	April 23, 1979
Written Comments on <u>Preliminary Report</u>	Until April 26, 1979
Grant of Leave to Intervene - Lake County	April 27, 1979
Socio/Economic Workshop	May 2, 1979

APPENDIX A
(continued)

Second Evidentiary Hearing	May 4, 1979
Issuance of <u>Final Report</u>	May 29, 1979
Committee Conference on <u>Final Report</u>	June 18, 1979
Hearing on <u>Final Report</u> and Proposed Decision on NOI before full Commission	June 20, 1979

APPENDIX B

Following is the written text
of a Public Comment submitted
at the Hearing on the
Preliminary Report

April 23, 1979

78-NOI-7

APR 23 1979

TO: California Energy Commission

ENERGY COMMISSION
RECEIVED

RE: DWR/ Bottlerock Preliminary Report

APR 24 1979

The official interests of Lake County are ably represented today by Supervisor Mostin, so today I'm speaking as a resident of the immediate area to be impacted by the proposed power plant and as a concerned citizen of Lake County.

I know the area. I live there. DWR will be using the same access road my family has used since the '20's. I have read the NOI, attended several workshops and hearings. As a member of the public actually impacted by your decisions in this matter I am, of course, interested in your process and your conclusions.

Although your "process" has at times seemed more esoteric than relevant, it was not until I participated in a GRIPS sponsored tour of the Geysers last month and realized several members of the Bottlerock siting staff were seeing geothermal steam power plants for the first time that I really began to worry. Then I read the Commission's Preliminary Report on the NOI.

Here I am, about to share my worries with you. Some aspects which must be considered in your decision of acceptability of this site for this project have been overlooked.

TRAFFIC IMPACTS- HIGH VALLEY ROAD

Five families daily use the approximately 1 - 3/4 miles of High Valley Road to be impacted by construction of this plant, for commuting to work and school, incidental trips and visitors. A work force of up to 109 persons plus delivery and service equipment using the same road must be addressed.

I urge the following mitigations to be funded by the developer: (a) Strict enforcement of a 15 mph speed limit. (b) flagman control at appropriate turn-out areas during heavy truck and equipment transport. (c) staggered hours for construction crews to reduce congestion at the intersection with Bottlerock Road and to allow safe two-way traffic on High Valley Road. (d) construction and maintenance of an improved roadway designed to carry the number and weight of anticipated vehicles. (e) guaranteed unimpaired access to residents using this road.

My own family's experience using this road before and during the present low level of field development is probably typical. Non-residents tend to drive around blind corners faster than road conditions dictate. Almost daily "near crunch" head on incidents with water trucks and speeding vehicles of all types combined with wide vehicle squeezes make our lives extremely hazardous. The fact that we have benefited by achieving vastly

improved driving reflexes does not compensate for our fear that one time we will not be able to respond quickly enough. I am not prepared to die for DWR.

TRAFFIC IMPACTS - BOTTLEROCK ROAD

Consider the traffic safety and road wear impacts on Bottlerock Road (3 miles to Highway 175, 8 miles to Highway 29).

That portion of Bottlerock Road between Sulphur Creek Road and Highway 175 (approx. 3 1/4 mi.) subject to geothermal development traffic already shows excessive wear and breakdown compared to the balance of the road. Traffic counts of commuters and heavy trucks from Highway 175 to the Sawmill Road entrance to the Geysers have increased dramatically since Sawmill Road became a primary access to the upper field. To a smaller but still noticeable degree, traffic has increased to High Valley Road during development of the steam field. I do not know the traffic counts, but I know many people who live along Bottlerock Road and report this to be true.

The intersection of High Valley Road and Bottlerock Road is particularly hazardous: narrow and short turning apron, Northbound Bottlerock traffic must slow or stop in the traffic lane below the crest of a hill to turn left onto High Valley Road, Southbound traffic approaches the intersection coming out of a left-bearing up hill turn with restricted visibility.

Traffic entering Bottlerock Road from High Valley Road has restricted visibility to North and South and enters Bottlerock on an up hill right hand turn to the south or a down hill left turn across the center lane to proceed north.

I have witnessed two accidents at this intersection between field development equipment and other vehicles and almost became a party to a third while waiting in the southbound lane of Bottlerock to left turn into High Valley Road. How can this intersection safely handle 109 workers plus service and delivery vehicles?

I suggest the following mitigations to be funded by the developer: (a) major recontouring of Bottlerock Road south of the intersection to reduce grade. (b) realignment of Bottlerock Road north of the intersection to straighten curve. (c) widening and installation of left turn pockets on Bottlerock (d) increase width and radius of turning apron on High Valley Road. (e) installation of speed zone signs on Bottlerock through residential areas. (f) curtailment of heavy truck and equipment travel hours to 7:00 AM to 10:00 PM except in emergency situations. (g) annual contribution to county road department. All of the above to be under the direction of Lake County Department of Public Works.

MICRO CLIMATE: FOGGING AND CLOUDS

From my house I can see the Coleman Meadow location of the presently drilling McCulloch-Coleman well and the steam plumes from the Francisco pad. The NOI indicates the power plant will also be visible to the S, SE of my house.

Since the wells have been venting and more recently with steam emitted from the Coleman drilling operation, I have observed local fogging in the meadow area to an altitude of about 200 ft. above ground. During cold weather, early morning and late night fog occasionally fills the meadow-valley area and spills down toward Bottlerock Road. Other times the condition is very localized and contained within the meadow area.

Steam plumes from existing Geysers power plants frequently rise several thousand feet creating substantial localized cloud banks which are observable from as far away as Lakeport, Lucerne and Lower Lake.

Has the question of micro-climatic change been addressed? Has the potential for induced fog on public roadways been discussed? While the plumes from the plant will emerge at an elevation higher than the wells, what is the potential for local fogging; the effect of chronic "clouds", the impact of introduced humidity throughout the year on the local biota and habitat? And further, what is the effect on me and my local environment to the W, NW? If I and other residents of the area had wanted to live in a cloudy, shaded place we probably would have chosen the coast, not Cobb Valley.

COST-BENEFIT, LOCAL ECONOMY

As a local tax payer and recipient of county tax-funded services, I am concerned with the local economy and tax base. Exploitation of the county's resources (including geothermal) resulting in overall measurable positive contributions to the local economy should be encouraged. Those business ventures not favorable to the overall local economic structure should not be permitted.

The Socio-Economic section of the Commission's Preliminary Report would be laughable if the consequences of its acceptance weren't so serious for Lake County. The Report seems to recommend a business arrangement no sensible corporation would even consider.

Would any corporation agree to the following proposal? DWR says to Lake County: "You have this valuable resource which could be a large revenue source to you but I'm going to take it and I'm not going to pay you. Furthermore, I'm going to use it to help remove another of your resources. I'm going to pump your water to Southern California. I'm going to build a big, expensive factory which makes clouds in one of your prime recreation and residential areas, crowd your housing market and use your roads, schools and services. But in exchange for all this plus 30 years

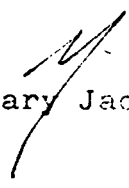
tax-free use of your depletable resource I'll hire about 50 local folks for three years. You might break even by taxing my partner the field developer, but don't talk to me about money."

Talk about lost opportunities! Robert Redford and Paul Newman didn't do any better than that in "The Sting"!

Depending on one's point of view, Lake County's participation to date in the development of its geothermal resources could be viewed as a partnership or as prostitution: wherein a little environmental degradation, a little dislocation, a little inconvenience was allowed as long as the privilege was paid for. I'm not against partnerships or prostitution as long as all parties are informed consenting adults, fair value is obtained and the parties are satisfied with the arrangement. It does not appear that any of the above are true in the case of the Department of Water Resources Bottlerock power plant. This is more like rape. There is no circumstance under which rape can be considered equitable. As presently proposed, the DWR/Bottlerock geothermal power plant would be an economic disaster for Lake County and should not be permitted.

Thank you for this opportunity to speak.

Sincerely,



Mary Jadiker

Jadiker
P.O. Box 28
Cobb, Ca. 95426

APPENDIX C

Following is the written text
of comments from the LCAPCO
submitted at the hearing on the
Preliminary Report

-and-

Public Agency Comment
submitted on the
Preliminary Report

APR 23 1979
APR 24 1979

78-NOI-7

LCAPCD Comments on the DWR Bottle Rock Powerplant Preliminary Report

The District has no critical comments to make with regard to the air quality section of the report (pages 33-48). The statements made in this section appear to be accurate. The proposed findings and conclusions have clearly been modified to reflect the concerns voiced by the Air District during the initial stages of the NOI process. They are acceptable to the District in their present form.

We would like to clarify two points. In the matter of steam stacking; a research and development program to develop chemical abatement for steam transmission lines has not yet been initiated on a "formal level". This R & D program was proposed by the District in January of this year, and was to involve participation of all developers now operating in the KGRA. The District is not in a position to "require" such a study. We are aware that McCulloch & DWR are beginning a steam transmission line chemical abatement program on their own.

It is hoped that this program will reach fruition prior to May 31, 1979. This is the deadline that the ARB has placed upon the District for adoption of its Model Rules. The steam stacking regulations currently being proposed are as follows:

B. Steam Transmission Lines

- 1) In the event of a scheduled outage, effective Jan. 1, 1980 Hydrogen Sulfide emissions shall be reduced to no more than 25% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 4 hours from the time of outage.
- 2) In the event of a scheduled outage, effective Jan. 1, 1986 Hydrogen Sulfide emissions shall be reduced to no more than 10% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 4 hours from the time of outage.
- 3) In the event of an unscheduled outage, effective Jan. 1, 1980 Hydrogen Sulfide emissions shall be reduced to no more than 25% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 5 hours from the time of outage.
- 4) In the event of an unscheduled outage, effective Jan. 1, 1986 Hydrogen Sulfide emissions shall be reduced to no more than 10% of the full unabated steam flow within 1 hour from the time of outage, and not more than is allowed by normal Power Plant operation within 5 hours from the time of outage.

With regard to trade-offs or emissions offsets, as described in finding 11, page 41 of the Preliminary Report, the District defines a "basin wide air quality benefit" as a benefit that is demonstrable in the area potentially impacted by the proposed project, as well as elsewhere in the basin.

April 23, 1979

Memorandum

To : Wendy Reid, Project Manager
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

Date : April 26, 1979

Subject: Preliminary Report on
AFC for DWR - Bottle Rock

78 - NOI - 7

Telephone: ATSS ()
()

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

ENERGY COMMISSION
RECEIVED

MAY 4 1979

Following are our comments on the subject project:

1. Appendix I should include to read:

III. Civil Engineering/ Solid Waste Management

Applicable Laws, Ordinances, Standards

Health & Safety Code, Section 25100 et. seq.
CA Administrative Code, Title 22, Section 60102
(new 66028) et. seq.

Relevant Findings & Conclusions

Findings 6, 7 & 8
Conclusion 3

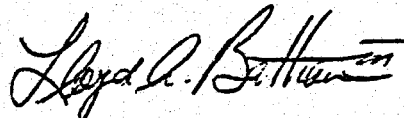
Preliminary Conclusions Regarding Compliance

Proposed project will comply with law and regulations
concerning hazardous waste disposal.

RECEIVED

MAY 8 1979

HEARING ADVISOR



Lloyd A. Batham, III
Waste Management Specialist

cc: Harvey F. Collins, Ph.D., Acting Chief HMMS

LAB:mv

APPENDIX D

Following are the written
comments submitted by
the Applicant on the
Preliminary Report

Department of Water Resources

Changes to Preliminary Report

on Bottle Rock NOI

78-NOI-7

APR 23 1979

ENERGY COMMISSION
RECEIVED

APR 24 1979

The Applicant believes the following are typographical errors:

- 1) page 6 line 12: The first word on this line should read "cut" not "fill".
- 2) Biological Resources page 51 footnote: The appendix referenced should be "E" not "D".
- 3) Socio Economic Impacts page 75 line 7: Reference to "Findings 12 and 13" should be changed to read "Finding 11".
- 4) Appendix I page 2 Civil Engineering/Solid Waste Management: The reference to "Finding 1" in Preliminary Conclusions Regarding Compliance should be "Finding 3".

The following items could be updated to reflect action taken:

- 1) page 9 last sentence in the last two lines: Two wells have been drilled from the Francisco pad; the Coleman pad has not yet been constructed and one well has been drilled from the Coleman pad.
- 2) Cultural Resources pages 63-64 Findings 6 and 7.
 6. Due to the nature and location of the archaeological 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 has provided 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~~ has supplied 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 to construction on the project. These interim mitigation measures, and a commitment from the Applicant to abide by them ~~shall~~ was submitted to the Commission ~~no later than January 15,~~ 1979. The Applicant agrees that there will be no project-related impacts to site 605.

In order to avoid any possible misinterpretations, the applicant suggests the following revision:

25. Because of the ability of the Bottle Rock Plant to comply with applicable H₂S 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 H₂S emissions limitations as specified in Finding No. 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 H₂S emissions limitations as specified in Finding No. 22 at the Bottle Rock Plant, or if sufficient data from Unit 15 is not available at the time of the AFC filing.

APPENDIX E

Following are the written
comments submitted by the
Commission staff on the
Preliminary Report

Memorandum

To : Bottle Rock Committee

78 - NOI - 7

Date: April 27, 1979

Telephone: ATSS ()
()ENERGY COMMISSION
RECEIVED

APR 27 1979

RECEIVED

MAY 1 1979

HEARING OR

From : California Energy Commission - Staff
1111 Howe Avenue
Sacramento, 95825

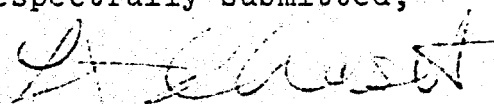
Subject: Commission Staff Responses to the Committee Preliminary Report

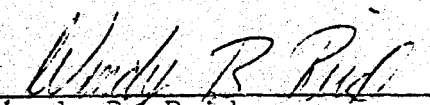
Commission Staff has reviewed the Committee's Preliminary Report on the Department of Water Resource's NOI for the Bottle Rock power plant, and offers the following comments on this Preliminary Report.

Overall, the Staff is in agreement with the contents of the Preliminary Report, and believes that based on the record, the Commission should approve the NOI.

The Preliminary Report adequately addresses most of the subject areas of concern for the purposes of the NOI. However, there are a number of small matters which, in the Staff's view, do require clarification. These matters are set forth below on a topic-by-topic basis.

Respectfully submitted,



Laurence G. Chaset
Staff Counsel

Wendy B. Reid
Project Manager.

CONFORMITY TO THE DEMAND FORECAST

For the most part, Staff accepts the Committee's findings and conclusions on the need for the Bottle Rock project. However, the Staff does have several comments and points of clarification on matters discussed in the Preliminary Report. These comments are attached as Appendix 1.

SITE-RELATED ISSUES

Air Quality

CEC-ARB Joint Statement. The Staff agrees with the Committee's statement, in the first footnote on page 35, that some aspects of the CEC-ARB Joint Policy Statement on Compliance with Air Quality Laws by New Power Plants (the Joint Statement) are not appropriate to the geothermal power plant process. However, to the maximum extent possible, the Staff is endeavoring to carry out the letter and the spirit of the Joint Statement in its review of air quality issues pertaining to proposed power plants which are before the Commission. Accordingly, the Staff intends to give great weight to the judgment of the APCO in making any recommendations on the air quality acceptability of the proposed Bottle Rock project, unless the Staff finds that the APCO's determination is clearly erroneous.

New Source Review. Due to upcoming deadlines in other projects, Staff is unable to provide its report on the status of applicable New Source Review (NSR) rules at this time. This report will be submitted under separate cover prior to the May 4 Evidentiary hearing.

to conform with applicable air quality requirements.

Despite the lack of certainty on this issue, the Staff does not feel that air quality requirements are an absolute constraint on the ability of DWR to build the Bottle Rock project. If the results of the Cobb Valley Joint Tracer Study indicate that the Bottle Rock plant may have some difficulties in complying with the Lake County APCD's NSR rule, DWR may be able to reduce project emissions below the expected rate of 13.2 lbs/hr H₂S, or to obtain emission reductions (trade-offs) from nearby existing sources of H₂S pursuant to LCAPCD Rule 602. Moreover, even though operating data from PG&E's Gyesers Unit 15 are not yet available to confirm the expected performance characteristics of the Stretford system, Staff understands that the Applicant is engaged in an active program to develop an alternative H₂S abatement system (based on condensate treatment with hydrogen peroxide) which should allow the Bottle Rock plant to meet applicable air quality regulations. Staff understands that work on this alternative system is sufficiently advanced such that, during the AFC, the Commission should be able to evaluate in detail the ability of this system to achieve conformance with the applicable requirements.

Biological Resources

Staff supports Finding Number 24 and concurs in the Committee's recommendation that a generic proceeding be implemented.

As yet, Staff has not formally met with the interested agencies to develop an agenda for a generic proceeding. However, it is Staff's

opinion that such a proceeding should address the following key points:

- 1) Cumulative impacts of geothermal development in the Geysers area;
- 2) Areas of biological importance;
- 3) Impacts, mitigation measures and monitoring programs;
- 4) Specific topics of concern include:
 - a) cooling tower drift on vegetation
 - b) siltation of fisheries
 - c) habitat loss

Further, the United States Fish and Wildlife Service has expressed concern on the impact of geothermal development on public access to federal recreation lands.

Finally, it is Staff's opinion that addressing the generic issues associated with geothermal development in the Geysers will further future compatibility between existing biological resources and the development of geothermal resources.

Cultural Resources

The Applicant has supplied the additional materials required under findings 7 and 8. A Staff supplemental position paper and proposed revisions to the Findings and Conclusions are attached as Appendix 2.

Noise

In part V of the Preliminary Report, on page 140, the Committee has identified an unresolved question relating to noise (Question 8).

This question relates to Finding 13 and Conclusion 9 under Noise, which require data demonstrating the noise emission level from the proposed facility at 500 feet. On December 20, 1978, the Applicant provided data showing the noise emission level from PG&E's Geysers Unit 7 and 8 and the measured noise attenuation curve. However, this data does not demonstrate what the noise emission level from the proposed Bottle Rock facility will be. The Applicant does not have to provide this project specific prior to the AFC submittal. However, the data should be provided at that time.

Socio/Economics

The Applicant has supplied the additional materials required under Findings 8 and 10. A Staff supplemental position paper and revisions to the proposed Findings and Conclusions are attached as Appendix 3.

Water Quality

Finding 5a on page 78 should be revised to read: "Porter-Colgne Water Quality Control Act."

The Committee's comment on the concerns of the State Solid Waste Management Board on page 80 are not appropriate under the Water Quality Section. They should be included in the Civil Engineering/Solid Waste Management Section.

PUBLIC HEALTH, SAFETY AND RELIABILITY

Public Health

Conclusion 4 on page 91 was agreed upon by Staff and Applicant at the Prehearing Conference. However, in view of testimony presented on January 25, 1979, this conclusion is incorrect.

On page 134, at the bottom of the page, the report states that PG&E has 14 units operating. It is Staff's understanding that only 12 units are operating.

Pages 97 and 98, Finding 8 and Conclusion 2 state that the Applicant shall provide detailed information on a proposed radon-222 monitoring program, if necessary, at or prior to the filing of an AFC. The words "if necessary" were included at the Applicant's request, until the Department of Health Services specified whether such a program is necessary. The words "if necessary" also appear on pages 131 and 142 where referring to the radon-222 program. The Department of Health Services (Memorandum from Kenneth Buell to James Walker, dated January 12, 1979; see Appendix C) has determined that a radon-222 monitoring program is warranted, and that DWR should submit a plan for appropriate radioactive emissions monitoring at the Bottle Rock power plant. Therefore, the words "if necessary" should be omitted from pages 97, 98, 131 and 142, when referring to the radon-222 monitoring program.

Structural Engineering

Staff believes that for the purposes of this NOI proceeding, the Preliminary Report adequately addresses the topic of structural engineering.

Reliability and Safety

For clarity, the Committee should include the footnotes contained in the February 5, 1979 submittal of mutually agreeable definitions of specific reliability and safety terms.

Geotechnology

Staff has no comment. However, Staff believes this subject area is more appropriately called Geology/Seismicity.

ADDITIONAL COMMENTS

- o Page 7, 2nd paragraph - ". . . strung with 1,113 MCM". . . should be ". . . strung with 1,113 KCM". . .
- o Page 40, "Limitation" is misspelled in Finding 6.

Memorandum

To : Commission Committee
DWR Bottlerock NOI

Date: April 20, 1979

Telephone: ATSS ()
()

Via: Wendy Reid
Larry Chaset

From : California Energy Commission
1111 Howe Avenue
Sacramento, 95825

Subject: COMMENTS ON BOTTLE ROCK PRELIMINARY REPORT

The Assessments staff accepts, in large part, the Committee's findings and conclusions regarding the need for the Bottle Rock Project. The staff also accepts the Committee's recommendation to study DWR's Supply Plan and Demand Forecast on a generic basis. However, the staff does have several comments and points of clarification which are offered to correct the record.

Although the staff has no objection to the Committee's recognition of the Sundesert and AB 1852 decisions (PR, p. 24 and 25), the staff does take exception to the conclusions the Committee has drawn from the need analysis sections in the Sundesert NOI and AB 1852 proceedings. Furthermore, for the purposes of the NOI, staff believes ample bases exist for establishing the need for Bottle Rock, and therefore, factual findings on need based on the Sundesert NOI and AB 1852 proceedings are not required.

DWR Capacity Needs

There is no dispute as to DWR's requirements for additional energy. However, the need to perform a detailed study of DWR's capacity needs has long been recognized by CEC staff. Staff has identified the following items in DWR's CFM II peak demand forecast which require scrutiny:

- ° DWR adds 100 MW to their peak demand forecast as a forecast adjustment. The 100 MW is unrelated to water requirements, therefore, the validity of this adder is questionable.
- ° DWR uses a 15 percent reserve margin, i.e., 15 percent additional capacity above the peak demand (the 15 percent is also applied to the 100 MW of contingency, i.e., an additional 15 MW is added). A 15 percent reserve margin is considered appropriate for a utility which has a high proportion of thermal generation (and hence, is subject to higher forced outage rates and maintenance) and which serves residential customers and other critical electrical users. This contrasts with DWR's requirement to pump water for the State Water Project. The canal and reservoirs are capable of holding a few hours of water, thus making the pumping load an ideal interruptible load. It may be that the normal utility practice of a 15 percent reserve margin need not apply to DWR's peak demand requirements.

- ° DWR appears to use about a 9 percent figure for capacity losses due to transmission. Staff believes a lower figure would be appropriate for DWR. Historically, two to three percent is representative for bulk transmission losses.

The Sundesert NOI and AB 1852 Proceedings

As discussed above, DWR's formulation of its CFM II peak demand forecast is subject to question. Staff believes DWR's forecast presented in the Sundesert proceeding was formulated like their CFM II forecast, and thus, is also subject to question. The following discussion expands upon this point.

The Committee cites Sundesert NOI decision number 7 as follows: "...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 reserve margins, but still with substantial energy deficits" (PR, p.25). Without Sundesert participation, as is now the case, DWR's reserve margins appear to fall below ten percent in 1984 and 1986. The following comparison of DWR's Sundesert data versus their CFM II submittal demonstrates that the actual reserve margin level is uncertain, and hence, disputable. Therefore, it is misleading to use DWR's estimate of reserve margins as presented in the Sundesert proceedings.

DWR FORECAST USED IN SUNDESERT NOI
November 1976

DWR CFM II FORECAST
March 1978

<u>YEAR</u>	<u>DEMAND</u>	<u>RESOURCES</u>	<u>RESERVE MARGIN</u>	<u>DEMAND</u>	<u>RESOURCES</u>	<u>RESERVE MARGIN</u>
1986	674Mw	727Mw	7.9%	536Mw*	676Mw**	26%
	-100					
	574	727	27.0%			

In DWR's CFM II submittal, a 100 Mw forecast adjustment (contingency) is added to their basic forecast. As discussed earlier, the validity of this adder is questionable. If one assumes DWR is providing its data consistently in both the CFM II and Sundesert NOI proceedings, the 674Mw figure also includes 100 Mw of forecast adjustment. When this 100Mw is removed, as illustrated above, a 27 percent reserve margin results -- a reserve margin that is now comparable to the 26 percent figure from their CFM II submittal.

*Without the 100Mw forecasting adjustment
**Without 55 Mw of Bottle Rock capacity

The forecast DWR used in the Sundesert NOI proceedings was also, at the time, subject to question. In the Sundesert NOI proceedings, staff witness Mr. Russ Miner stated (in reference to the DWR demand forecast and the water contractor forecasts upon which DWR's forecast is based):

The value of the forecasts is questionable, being in all likelihood not consistent with the Commission-adopted assumptions which show a break from historical trends (Sundesert Final Report, Page 15).

Based on the above, it is important that the Committee not base its capacity findings of Bottle Rock on the Sundesert NOI proceedings.

The Committee's use of the AB 1852 proceedings is also inappropriate. The studies were not intended to definitively determine DWR's capacity requirements.

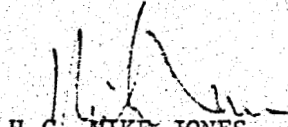
Staff, therefore, urges that neither proceeding be used as a basis for demonstrating capacity need for the Bottle Rock facility. Until the Commission adopts a capacity and energy forecast for DWR, the assessment of demand conformance must be approached with caution. Therefore, the staff recommends that findings 10 and 11 which apply to the Sundesert and AB 1852 decisions, respectively, be vacated. Sufficient factual bases are provided by findings 3, 7, 8, 9, and 14.

Points of Clarification

1. Preliminary Report Conclusion No. 2: "55 MW of energy" is an incorrect statement. A more correct statement would be "385 Gwh of energy based on an 80 percent capacity factor."
2. The staff wishes to inform the Committee that DWR's supply plan will be evaluated in the Biennial Report II proceeding but not specifically in the Generic Technology Assessment proceeding as the Committee has suggested (PR, p. 134).

If you have any questions on any of the above, contact Eric Wong at 6248.


GARY SIMON
Assessments Division
(6963)


H.G. MIKE JONES
Assessments Division
(6248)

APPENDIX 2

SUPPLEMENT

Staff Position Paper of Gary C. Heath Cultural Resources - DWR Bottle Rock Geothermal Project

On January 16, 1979 Staff received DWR's interim mitigation plan to offset any additional project-related impacts to archaeological sites CA-LAK-609 and 610. The interim mitigation measures were found to be satisfactory. In addition, on March 20, 1979 Staff received a study, Archaeological Investigations at CA-LAK-609 and CA-LAK-610, High Valley, Lake County, California compiled by Dr. David Fredrickson. The study concluded that the proposed project would impact these two archaeological sites.

According to Dr. Fredrickson, both archaeological sites meet the criteria for inclusion in the National Registry of Historic Places. The study fulfills the requirements established by the Society for California Archaeology for Archaeological Impact Evaluation, March 1979.

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 archaeological 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 archaeological 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 archaeological resources at sites CA-LAK-609, the Applicant undertaken additional studies to determine the significance of these resources. The Applicant provided a report to the Commission detailing the results of these studies.

7. The Applicant has provided interim mitigation measures, 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.

8. If the identified archaeological 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

DECLARATION OF GARY C. HEATH

I, Gary C. Heath, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental and Health Office as a Planner I - Energy Facility Siting.
2. A copy of my professional qualifications and experience has been filed previously in this proceeding and is by reference incorporated herein.
3. I prepared the attached supplement to the Staff position paper on Cultural Resources based on my review of supplements to the notice of intention, other reliable reference documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared position paper is a valid and accurate analysis of the issues addressed therein.
5. The list of applicable laws, ordinances, and standards identified in Finding 2 of the attached proposed findings and conclusions on Cultural Resources is true and correct to the best of my knowledge and belief.
6. It is my professional opinion that the proposed DWR Bottle Rock Geothermal Project has a substantial likelihood of complying with the applicable laws, ordinances, and standards listed in Finding 2 of the proposed findings and conclusions.
7. Support for the conclusions reached in paragraph 6 above is found in the notice of intention, my position paper and supplement filed in this proceeding, other reliable reference documents and sources, and my professional experience and knowledge.
8. I am personally familiar with the facts related herein and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 12-26-79

Gary C. Heath
Gary C. Heath

APPENDIX 3

SUPPLEMENTAL STAFF POSITION PAPER

SOCIO/ECONOMIC IMPACTS

DWR BOTTLE ROCK GEOTHERMAL PROJECT

Staff has reviewed the Committee's proposed Findings of Facts and Conclusions as presented in the Preliminary Report on the NOI and is satisfied with the validity of most of the statements and can add no further comments. However, Findings numbered 8 and 10 require the Applicant to provide additional information relating to the availability of housing and the costs borne by local jurisdictions.

First, Finding No. 10 (page 72) directs the Applicant to provide additional information on the availability of housing in the project area. The Applicant has provided such information, as is best available, and that data supports the Conclusion that adequate housing will be available.

Second, with regard to Finding No. 8 (page 72) the Applicant has provided information which, although not in specific dollar estimates, indicates that the cost to local jurisdictions, as a result of the project, would be minimal relative to the estimated \$230,000 in property taxes that would be collected annually by Lake County as a result of the steamfield development. (The actual power plant, being owned by DWR, is technically exempt from property taxation.) However, it is still not clear at this time whether the costs will indeed be minimal or become, over time, a significant financial burden. The controversy focuses primarily on Bottle Rock Road, which is the only paved access into the project area.

Although Lake County has not imposed any vehicle weight limit for the road less than the maximum legal highway limit permitted in the Vehicle Code, the road design and construction is such that the increased heavy traffic resulting from the proposed project could increase the frequency of maintenance. Depending on the extent of damage that might occur, estimated maintenance costs could range from about \$500 per day for spot patching, up to \$75,000 per mile for rebasing and resurfacing. Furthermore, parts of the road do not have an underbasing which could lead to accelerated road failure.

Moreover, Lake County has petitioned to intervene in the Bottle Rock NOI proceeding. In its Petition, Lake County stated that the project might pose significant adverse socio-economic impacts to the County, in large part because of the tax exemption status of the proposed power plant and the additional public service costs that may accrue to the County because of the development of this project. Additionally, the Petition states that the project may not be compatible with existing land use in the Cobb Valley Area. However, Staff believes that the matters raised in Lake County's Petition to Intervene do not pose a significant constraint to siting the Bottle Rock project, as each of these potential impacts appears to be mitigable. Accordingly, the Committee can review these matters in greater detail, if necessary, during the AFC and impose appropriate conditions to mitigate those potential impacts. Staff's response to the matters set forth in Lake County's petition is as follows:

Public Services

The original staff position paper concluded that any costs that would be incurred by Lake County as a result of the project would be

minimal and that estimated tax revenues from the steamfield would be sufficient to offset these costs. In a memorandum to the CEC dated January 15, 1979, the Applicant provided additional information relating to expected tax revenues and potential costs to local jurisdictions which tended to support the original staff conclusion. However, Lake County, in making particular references to regulatory costs, schools, and Bottle Rock Road, has filed a Petition to Intervene which indicates that the project would result in significant costs to Lake County which would not be offset by the anticipated tax revenues. The Petition, though, does not provide any data indicating the level of increased regulatory or school district costs. It did state that Bottle Rock Road does not have a proper structural base or sufficient width at all points to adequately handle continuous heavy truck traffic. Communications with the Lake County Department of Public Works indicated that repair costs to Bottle Rock Road could range from about \$500 per day for spot patching up to \$75,000 per mile for rebasing and resurfacing. Without further information to the contrary, the costs to Lake County would appear to be minimal and the anticipated tax revenues sufficient to offset these costs.

Housing

Contrary to Staff's conclusions in the original position paper and to the additional information provided by the Applicant in the January 15 memorandum, the Petition indicates that there does not exist an adequate supply of housing to accommodate geothermal workers associated with the project. The Petition claims that this is evidenced by the use of illegal trailers for temporary housing. Without further data, Staff concludes that the housing supply appears adequate to accommodate the project workforce.

Land Use

The Petition also states that the project may not be compatible with existing land use in the area and that it may constitute an irreversible single land use commitment which may preclude the use of other resources in the area. As discussed in Staff's original position paper, the project is located in an area which the Lake County General Plan shows as unclassified. The project is not in conflict with any criteria set out in Lake County's Conditions, Procedures, and Performance Standards for Geothermal Regulation, which was adopted by the Lake County Planning Commission in 1972. Furthermore, the power plant site and leasehold is situated in an area which is substantially leased for geothermal exploration and development. Therefore, the project appears to be compatible with existing applicable land use standards and regulations.

AMENDMENTS TO THE PROPOSED
SOCIO/ECONOMIC IMPACT
FINDINGS AND CONCLUSIONS

Staff recommends that the following revisions be made to the Findings and Conclusions in the Socio/Economic section:

Finding

8. The applicant has submitted information on estimated public service costs and tax revenues necessary to demonstrate that the costs to Lake County will be minimal. At the Preliminary Report Hearing on the Bottle Rock NOI, the applicant agreed to meet with Lake County develop measures to mitigate any substantial costs which maybe incurred by Lake County as a result of this project.

10. The applicant has provided information on the availability of housing in the project area. This information demonstrates that adequate housing will be available to accomodate the work force associated with the proposed project.

An additional finding should be added which reads:

The applicable laws and standards are:

- a. Lake County General Plan Land Use and Open Space/Conservation Elements,
- b. Conditions, Procedures, and Performance Standards for Geothermal Regulation, adopted by Lake County Planning Commission, April 13, 1972, and
- c. Lake County Zoning Ordinance.

CONCLUSION

6. The Bottle Rock project is acceptable from the standpoint of Socio/Economic impacts for the purposes of the NOI.

DECLARATION OF MICHAEL SMITH

I, Michael Smith, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental and Health Office as a Planner I - Energy Facility Siting.
2. A copy of my professional qualifications and experience has been filed previously in this proceeding and is by reference incorporated herein.
3. I prepared the attached supplement to the Staff position paper on Cultural Resources based on my review of supplements to the notice of intention, other reliable reference documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared position paper is a valid and accurate analysis of the issues addressed therein.
5. The list of applicable laws, ordinances, and standards identified in the attached proposed findings and conclusions on Socioeconomic Impacts is true and correct to the best of my knowledge and belief.
6. It is my professional opinion that the proposed DWR Bottle Rock Geothermal Project has a substantial likelihood of complying with the applicable laws, ordinances, and standards listed in the recommended additions to the Findings in the Socio/Economic section.
7. Support for the conclusions reached in paragraph 6 above is found in the notice of intention, my position paper and supplement filed in this proceeding, other reliable reference documents and sources, and my professional experience and knowledge.

APPENDIX F

Following is the report
prepared by the Commission
staff on the status of
New Source Review Rules

On February 16, 1979, the California Air Resources Board adopted a new model NSR rule. As we indicated on page 2 of our comments on the Preliminary Report, this rule is intended for inclusion in the State Implementation Plan for those areas which do not attain federal standards. Lake County is an attainment area for all pollutants which are subject to federal standards.

Hydrogen sulfide (H_2S), the major pollutant of concern which is emitted by geothermal power plants, is subject to a state, not a federal, standard. Accordingly, the adoption of the new model rule should not directly affect the air quality review of geothermal power plants in the Geysers area.

It is possible that the ARB could make the model rule applicable to state-regulated pollutants in the Lake County and Northern Sonoma County APCD's by adopting this rule for these district. However, Staff has no indications that the ARB is intending to carry out such an action. Moreover, Staff believes that such an action would be inappropriate and is therefore unlikely to occur. The two districts are attainment areas for pollutants other than H_2S , and the ARB has been working on a continuing basis with the relevant APCD's, with the Commission Staff and with geothermal developers to create an appropriate control strategy which will protect air quality but which will also be consistent with a policy of promoting the expeditious development of geothermal resources. In light of these circumstances, the Staff believes that the ARB will not adopt the model rule for these districts, because such a rule would not accomplish any more than is already being accomplished by the already existing strategies. In addition, such a rule could pose unnecessary additional hindrance to reasonable further geothermal development.

The ARB has, however, recently proposed to the districts a new approach to the air quality review of geothermal power plants. (See letter from Thomas C. Austin, Executive Officer of the ARB to Steve Zalusky, Acting APCO of the LCAPCD, which is attached hereto.

The proposal would delete the requirement for an air quality impact assessment if an applicant proposes to limit H₂S emissions to 5 lbs/hr or less. At this emission rate, a plant's emissions would have no detectable surface level impact, and further new source review would be unnecessary. If the applicant does not limit emissions to this level, it must conduct a full analysis. Generally, Staff supports the 5 lbs/hr proposal. However, the districts should retain the discretion to require a limited number of tracer releases to confirm the assumption that at a particular site, an emissions rate of 5 lbs/hr will have no detectable impact.

Dated: May 23, 1979

Respectfully submitted:

A handwritten signature in dark ink, appearing to read "L. G. Chaset", written over a horizontal line.

Laurence G. Chaset
Staff Counsel

This letter was also sent to the APCO of Northern Sonoma County APCO

RECEIVED

FEB 8 1979

TECHNICAL COUNSEL OFFICE

Mr. Steve Zalusky
Acting Air Pollution Control Director
Lake County Air Pollution
Control District
255 North Ferris Street
Lakeport, CA 95483

Dear Mr. Zalusky:

In response to suggestions made by several interested parties, the staff of the Air Resources Board (ARB) has developed a proposed new policy to be used by the ARB and local air pollution control districts in evaluating new geothermal power plants at the Geysers RMA. This policy is fully consistent with our respective mandates for protecting air quality, while at the same time providing more regulatory certainty for geothermal power plant applicants by virtually eliminating air quality as an adjudicatory issue before the Energy Commission. In addition, this policy embodies the State's desire to promote expeditious development of geothermal resources as a preferred energy source.

Under the present review procedure, each geothermal power plant applicant is required to conduct an air quality modeling study to determine whether the emissions from the proposed source will cause or exacerbate a violation of the ambient air quality standard for hydrogen sulfide (H_2S). The reason for requiring a modeling study is that the H_2S emission rates from proposed geothermal power plants are still high enough to cause concern. Such studies require significant amounts of detailed information, which is costly and time-consuming to obtain, (e.g. information on emission parameters, meteorological conditions and topographical features). However, the application of modeling techniques in complex terrain such as that which exists at the Geysers often results only in introducing other uncertainties into the regulatory process due to the many simplifying assumptions that the modeling requires.

My staff has completed an analysis showing that if the emission rate of new geothermal power plants is reduced to five pounds per hour (lbs/hr), there will be no detectable surface level impacts. We believe that the 5 lbs/hr rate is sufficiently stringent so as to preclude the

need for air quality modeling. We also believe that this rate can be easily achieved by new power plants with surface condensers using the Stratford process for control of H_2S in the noncondensable stream and H_2O_2 injection for control of H_2S in the condensate stream.

The result of a modeling study (Attachment I), performed by my staff, indicates that a maximum hourly average surface level concentration of 0.78 microgram per cubic meter, or 0.88 parts per billion (ppb) will occur at an emission rate of 5 lb/hr. The 0.78 $\mu g/m^3$ reflects a level which is 1.5 orders of magnitude below the H_2S ambient air quality standard (30 ppb). The maximum H_2S concentration was estimated by using the "box" three-dimensional numerical model. The assumption used to estimate the maximum H_2S concentration was presented in Attachment I. Therefore, we consider that a new plant with an emission rate of 5 lb/hr will have an acceptable surface level impact, and that a 5 lb/hr emissions limitation for new geothermal power plants would be an acceptable alternative to new source review rules in the Geysers RRA.

All new power plants proposed for the Geysers are planning to use the Stratford process on the noncondensable stream. If correctly sized, the Stratford units will remove at least 90% of the H_2S in the noncondensable stream. FMC Corporation has pioneered the development of H_2O_2 injection for control of H_2S in condensate streams at the Geysers.

Recent tests have been conducted on PG&E's Unit 11 and we understand that preliminary results indicate that the H_2O_2 injection system can achieve 90% H_2S control on condensate streams. There is every reason to believe that these systems combined at the same facility can result in H_2S emission rates of 5 lb/hr or less. Therefore we believe that any new power plant proponents who commit to this degree of control for their facilities should be exempt from modeling and all other requirements of new source review rules.

Of course the final step in proving the feasibility of this high degree of control will have to be accomplished through practical application. To meet this goal, we have contacted PG&E and expressed our desire for a comprehensive emissions test conducted as expeditiously as practicable following start-up of Unit 15 to demonstrate the Stratford and H_2O_2 technologies. In this regard, we believe that work should begin soon to develop a test procedure for Unit 15 that will ensure a high degree of accuracy and reliability during data gathering. We will shortly schedule a meeting between PG&E and the staffs of the ARD and Districts to further discuss this matter.

Prior to such a meeting, we would like you to consider our proposal for a revised new source review policy as expressed in this letter. If your reaction is favorable, we would like to discuss with you what actions your District can take to adopt this concept in your rules and regulations.

APPENDIX G

Exhibit List

STATE OF CALIFORNIA
STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

78-NOI-7

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 Homee 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 Geotechnical 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 United States Steel, "Seamless Casing, Tubing and Drill Pipe", published 1972. Submitted by Mr. McNay of DWR. Marked for identification and admitted January 25, 1979.
- 37 Steam Production Zone and Cross Section of They Geysers Map. Submitted by Dr. Grose, DWR. Marked for identification and admitted January 25, 1979.

Exhibit No.

- 38 Declaration of Ron Shimizu, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 39 Declaration of Philip Leitner, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 40 Declaration of Dale Martfield, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 41 Declaration of David Fredrickson, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 42 Declaration of John Marlette, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 43 Declaration of Eugene Serr, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 44 Declaration of J. Gary Steenhoek, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 45 Declaration of William Simmons, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 46 Declaration of Donald Smith, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 47 Declaration of Richard Lallatin, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 48 Declaration os Albert Torres, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 49 Staff's Package of Documents, submitted by CEC. Marked for identification and admitted May 4, 1979.
- 50 Resumes of Dan Fong and Paul Junker, submitted by CEC. Marked for identification and admitted May 4, 1979.
- 51 Supplemental Findings and Conclusions, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 52 Declaration of Michael Smith, submitted by CEC. Marked for identification and admitted May 4, 1979.
- 53 Declaration of Darwin Hall, submitted by DWR. Marked for identification and admitted May 4, 1979.
- 54 Supplementary document and declaration on Cultural Resources, submitted by CEC. Marked for identification and admitted May 4, 1979.

APPENDIX H.

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)
 Certification)
 Re Bottle Rock NOI)

DOCKET NO. 78-NOI-7

APPLICANT

Department of Water Resources
 Mr. Bruce Johnson
 1416 Ninth Street, Room 440-40
 Sacramento, CA 95814

C. Suzanne Reed
 California Energy Commission
 1111 Howe Avenue
 Sacramento, CA 95825

Alan Pasternak
 California Energy Commission
 1111 Howe Avenue
 Sacramento, CA 95825

PARTICIPANT

McCulloch Oil Corporation
 Attention: W. F. Bates
 10880 Wilshire Boulevard
 Los Angeles, CA 90024

Office of the Secretariat (12)
 California Energy Commission
 1111 Howe Avenue, MS 35
 Sacramento, CA 95825

REPORTER

Ron Peters Certified Shorthand Reporter
 7700 College Town Drive, Suite 213
 Sacramento, CA 95826

Larry Chaset, Esq.
 California Energy Commission
 1111 Howe Avenue
 Sacramento, CA 95825

INTERVENOR

Raymond J. Mostin, Chairman
 Board of Supervisors
 County of Lake
 255 N. Forbes Street
 Lakeport, CA 95453

Stephen Kolb
 Office of the Public Adviser
 California Energy Commission
 1111 Howe Avenue, MS 15
 Sacramento, CA 95825

CALIFORNIA ENERGY COMMISSION

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

Stanley Valkosky
 Office of the Hearing Adviser
 California Energy Commission
 1111 Howe Avenue, MS 14
 Sacramento, CA 95825

APPENDIX I

Proposed Decision

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:)

Notice of Intention of the STATE
OF CALIFORNIA DEPARTMENT OF WATER
RESOURCES to file an Application
for Certification RE: DWR Bottle
Rock Geothermal Project)

DOCKET NO. 78-NOI-7

PROPOSED DECISION

On May 29, 1979, the Committee assigned to this proceeding issued its Final Report pursuant to Public Resources Code section 25514. The Committee then held a public Conference on June 18, 1979, in Lakeport, to receive comments on the Final Report.

A public hearing on the Committee's Final Report and Proposed Decision was held before the full Commission on June 20, 1979, in Sacramento. After considering the comments made at that hearing, the Preliminary and Final Reports prepared by the Committee, the evidence and comments presented in the course of the hearings and conferences during the Notice of Intention process, and documents entered in the record of the Notice proceedings, the Commission hereby APPROVES the DWR BOTTLE ROCK Notice of Intention, subject to criteria set forth in the Findings and Conclusions contained in the Final Report. In arriving at this decision on the Notice, the Commission adopts the recommendation of the Committee, the Committee's narrative contained in the Preliminary Report to the extent it supplements the Final Report, and the narrative, analysis, and Findings and Conclusions contained in the Final Report. Although significant concerns have been raised during the Notice of Intention proceedings, no party, public agency, nor member of the public has significantly contested or objected

to approval of the Notice and the Commission is aware of no substantial reason why the Notice should not be approved,

Findings and Conclusions

The Commission hereby makes the following Findings and Conclusions, for the purposes of the NOI:

1. The proposed project conforms with the Commission's most recent demand forecast adopted pursuant to Public Resources Code section 25309(b).

2. Based upon the record to date, it is reasonably likely that the proposed project can be constructed and operated in conformance with presently applicable local, regional, state, and federal standards, ordinances, and laws, including long range land use plans or guidelines.

3. Based upon the record to date, it is reasonably likely that the proposed project could conform to the applicable public health and safety laws and standards.

4. Based upon the record to date, the proposed plant would meet reasonable reliability criteria.

5. Based upon the record to date, the single site proposed in the Notice of Intention proceedings is acceptable for the proposed project, subject to the conditions stated in the Final Report and incorporated by reference herein.

The Commission makes the foregoing Findings and Conclusions solely for the purposes of this Notice of Intention proceeding.

Commission Order

The Commission ORDERS that, absent a showing of good cause, the topic areas of Hydrology, insofar as stream and overland flooding are concerned, and Water Resources will require no further review during the Application for Certification proceedings, as stated in the Committee's Final Report.

The Commission further ORDERS the Applicant, the State Department of Water Resources, to perform the following, together with any other acts specified in the Final Report, prior to or at the filing of an Application for Certification on the proposed project:

I. Air Quality

a) The Applicant shall specify the control system or systems to be used by the steam supplier, or shall provide other information which will verify that its steam supplier will be able to comply with Lake County Air Pollution Control District Rule 411.

b) The Applicant shall provide information on the airborne emission rates and concentrations from the Stretford Unit.

c) The Applicant shall perform an air quality analysis, as specified in the Findings of the Final Report, adequate for the purposes of demonstrating compliance with Lake County Air Pollution Control District rules.

d) The Applicant shall provide either: 1) sufficient operating data from PG&E Geysers Unit 15 to determine, with reasonable cer-

tainty, 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 limitation, or the limitation as determined by the air quality analysis as required to meet New Source Review requirements, whichever is stricter; or 2) 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 1) above, or if sufficient data from Unit 15 is not available at the time of the AFC filing.

e) The Applicant shall provide detailed information on the method of control which will be used during periods of steam stacking.

f) The Applicant shall obtain, from the steam supplier, and provide 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" to the continued violation of an Ambient Air Quality Standard.

II. Biological Resources

a) The Applicant shall cooperate with Commission staff in identifying additional grassland areas as "areas of critical concern" and shall specifically describe any areas and the basis for their classification.

b) The Applicant shall consult with the California Department of Fish and Game and develop detailed mitigation measures for wildlife habitat loss associated with the development of the power plant site and steam field. The Applicant shall submit a report on these matters, including a detailed discussion of how the cumulative impacts of development of the power plant site and steam field can be mitigated.

c) The Applicant shall specify the mitigation measures necessary to provide protection to off-site wildlife habitat and spawning areas in High Valley Creek.

d) The Applicant shall provide a detailed discussion of the nature of the monitoring programs which it will conduct in order to evaluate the actual impact of the project on biological resources.

III. Civil Engineering

The Applicant shall provide specific design criteria for a spoil area, if it is required.

IV. Need/Demand Conformance

The Applicant shall provide detailed and verified data demonstrating the relative merit and cost comparison of energy from the proposed project as compared to the cost of purchased power.

V. Noise

The Applicant shall provide detailed data demonstrating that the Bottle Rock power plant will produce a noise level no greater than 60 dBA at 500 feet.

VI. Public Health

- a) The Applicant shall submit a proposal specifying the manner in which continued monitoring of ambient H_2S concentrations in the vicinity of the Bottle Rock plant will be effected.
- b) The Applicant shall provide estimated ammonia emission rates and an analysis of the air quality impact of project ammonia emissions.
- c) The Applicant shall provide estimated arsenic emission rates and resulting ambient arsenic concentrations.
- d) The Applicant shall provide estimated mercury emission rates and an analysis of resulting ambient mercury concentrations.
- e) The Applicant shall provide detailed information on a proposed ^{222}Rn monitoring program, if necessary, in accordance with the appropriate Findings and Conclusions contained in the Final Report.
- f) The Applicant shall provide additional information regarding the rate of Total Suspended Particulates emissions during periods of steam stacking.

VII. Reliability and Safety

a) The Applicant shall provide: 1) more detailed criteria for redundancy, related to the consequences of forced outages; 2) more detailed criteria for reliability analysis to determine the appropriate level of quality control and inspection for components essential to power generation; 3) criteria for acceptability and approval of vendor's quality control program; 4) Applicant's plans for verification of conformity to stated requirements; 5) in lieu of 1) and 2) above, the Applicant may describe to what degree it will rely on PG&E's operating experience according to the criteria specified in Finding Number 4 of the "Reliability and Safety" portion of the Final Report.

b) The Applicant shall designate which power plant and related facility components are critical for project reliability, and justify such designations.

c) The Applicant shall specify designated lateral forces which all tanks, storage bins, and cylinders will be designed to resist in the event of the Maximum Probable or Maximum Credible Earthquakes.

VIII. Socio-Economic Impacts

The Applicant shall submit a report detailing agreements reached and mitigation measures adopted with Lake County. If agreement has not been reached in all areas of concern to Lake County, the Applicant shall submit a report describing the status of the negotiations and specifying the particular matters

remaining in dispute. This report need not contain information relating to the respective positions of the parties taken during the course of the negotiations regarding any matters upon which agreement has been reached or which still remain in dispute.

IX. Soils

The Applicant shall provide the specific designs and schedules for the implementation of appropriate mitigation measures specified in the Final Report.

X. Structural Engineering

a) The Applicant shall specify the design live loads for which the facility will be designed, in accordance with "Structural Engineering" Finding Number 3 of the Final Report.

b) The Applicant shall provide the specific equivalent lateral forces for the various components of the proposed facility, and explain the methodology which it employs to determine these equivalent lateral forces, including the method used for determining structural amplification of ground motions.

XI. Systems Engineering

a) The Applicant shall 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.

b) The Applicant shall provide a description of the procedures to be followed by a control operator to determine the appropriate response to an emergency or abnormal condition at the facility, and a description of the basis for a decision by the operator to shut the plant down.

c) In responding to a) and b) above, the Applicant shall specifically respond to the questions contained in "Systems Engineering" Finding Number 4 of the Final Report.

XII. Water Quality

a) The Applicant shall submit detailed design criteria for the retention barrier and liner which would surround the entire plant, as specified in "Water Quality" Finding Number 6 of the Final Report.

b) The Applicant shall provide a detailed description of facilities, equipment, and monitoring, operating, and reporting procedures necessary to assure that the spill retention systems will comply with all applicable regulations and standards as set forth in the Final Report.

c) The Applicant shall provide a detailed monitoring plan to evaluate the long term impacts of plant construction and operation on High Valley and Kelsey Creeks.

d) The Applicant shall provide specific details of its proposed sewage disposal facilities and their operational capabilities.

The Commission intends that the foregoing enumeration not be considered exclusive, but rather is intended to include the data, information requirements, and tasks stated in the Final Report, especially the Findings and Conclusions therein, and as clarified and elaborated upon in the narratives in the Preliminary and Final Reports on the proposed project.

Approved: _____