800-78-006

CALIFORNIA ENERGY COMMISSION

MASTER

FINAL REPORT

ON THE

NORTHERN CALIFORNIA POWER AGENCY'S

NOTICE OF INTENTION

TO FILE AN APPLICATION FOR CERTIFICATION

of

NCPA GEOTHERMAL PROJECT No. 2

78-NOI-5

MARCH 1979

DISCLAIMER

211A:17 R3 2/22/79

STATE OF CALIFORNIA—THE RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

CALIFORNIA ENERGY COMMISSION
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March 2, 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 Northern California Power Agency's Geothermal Project No. 2 (78-NOI-5), hereby submits its Final Report pursuant to Public Resorces 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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APPENDICES

I. INTRODUCTION

A. The Final Report

On August 11, 1978, the Northern California Power Agency (NCPA; Applicant) filed with the Energy Resources Conservation and Development Commission (the Commission) a Notice of Intention (Notice; NOI) to file an Application for Certification (Application; AFC) of its Geothermal Project No. 2 power plant, associated facilities, and transmission tie-line proposed to be constructed in Sonoma County. Some of the steam wells required to supply the proposed project may be located in Lake County.

1. Contents

This Final Report on the NCPA Geothermal Project No. 2 power plant proposal has been prepared pursuant to California Public Resources Code section 25514. It presents the final Findings of fact and Conclusions of 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 consideraion by the full Commission. In addition, this Report contains a description of the proposed project (Section I.B.), a summary of the proceedings to date (Section I.C.), and local, state, and federal government agency comments on the Preliminary Report (Appendix C). 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 Notice as recommended by the Committee.

Pursuant to Public Resources Code section 25514, this Report presents final Findings and Conclusions on:

1) conformity to the forecast of statewide and service area electric power demands;

2) conformity of the proposed site and facility with applicable local, regional, state, and federal standards, ordinances, and laws; and

3) the safety and reliability of the facility.

2. Evidentiary Basis

Following informational hearings and conferences on the Notice, the Committee, on December 6, 1978, issued its Preliminary Report. This document was based upon public comments presented during hearings and conferences on the Notice, comments submitted to the Commission by local, regional, state, and federal agencies, position papers prepared by the Commission staff on various issues, and a Joint Statement of Findings and Conclusions (Joint Statement) with supporting affidavits proposed to the Committee by the Applicant and the Staff for adoption and incorporation into the Preliminary Report. The Committee gave all those interested in the proceeding an opportunity to question or object to any Finding or Conclusion proposed for adoption and contained in the Joint Statement. Prior to issuing the Preliminary Report, the Committee held a Prehearing Conference at which the Joint Statement was presented. At this Conference, the Committee asked each party whether it wished to cross-examine witnesses for the other party or present evidence of its own.

In the absence of a request by any party to cross-examine witnesses or to sponsor its own witnesses, the Committee found that no purpose would be served by holding evidentiary hearings prior to issuing the Preliminary Report.

A hearing concerning the Preliminary Report was then held on December 21, 1978. During that hearing, no party, Federal participant, member of the public,

nor public agency suggested that formal evidentiary hearings were necessary to address any issue dealt with in the Preliminary Report; neither was there any request for an evidentiary hearing on any matter not discussed in the Preliminary Report. Rather, there were requests for amendments to the Findings and Conclusions of the Preliminary Report, as well as requests for certain textual changes.

Following this hearing, the Committee ordered that a public evidentiary hearing be held in order to provide the Applicant, Staff, and anyone else interested with an opportunity to:

a. Formally state their positions regarding the acceptability of the proposed project in general, and the preliminary Findings and Conclusions in particular;

b. Formally submit written and/or oral offers of proof supporting their respective positions;

c. Participate in a forum wherein the offers of proof were subject to question by members of the public and concerned public agencies, and subject to the opportunity for challenge, rebuttal, and/or cross-examination by any opposing party;

d. Formally enter their respective positions concerning actual or potential compliance with applicable local, regional, state, and federal standards, ordinances, and laws into the evidentiary hearing record; and,

e. Discuss changes to the Findings, Conclusions, and other matters contained in the Preliminary Report.

This Final Report thus restates and, where the Committee deems appropriate, amends the Findings and Conclusions of the Preliminary Report.

3. Opportunity for Response

The Committee will hold a Committee Conference on the Final Report on March 12, 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 opporturnity to comment on this Report.

As indicated by the Proposed Decision (Appendix E), 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 March 14, 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, NCPA may file an Application for Certification of its Geothermal Project No. 2. Following further proceedings on the Application, the Commission will act to grant or deny certification. Such action could occur as early as the late summer of 1979.

B. Description of the Proposed NCPA Geothermal Project No. 2

1. The Facility

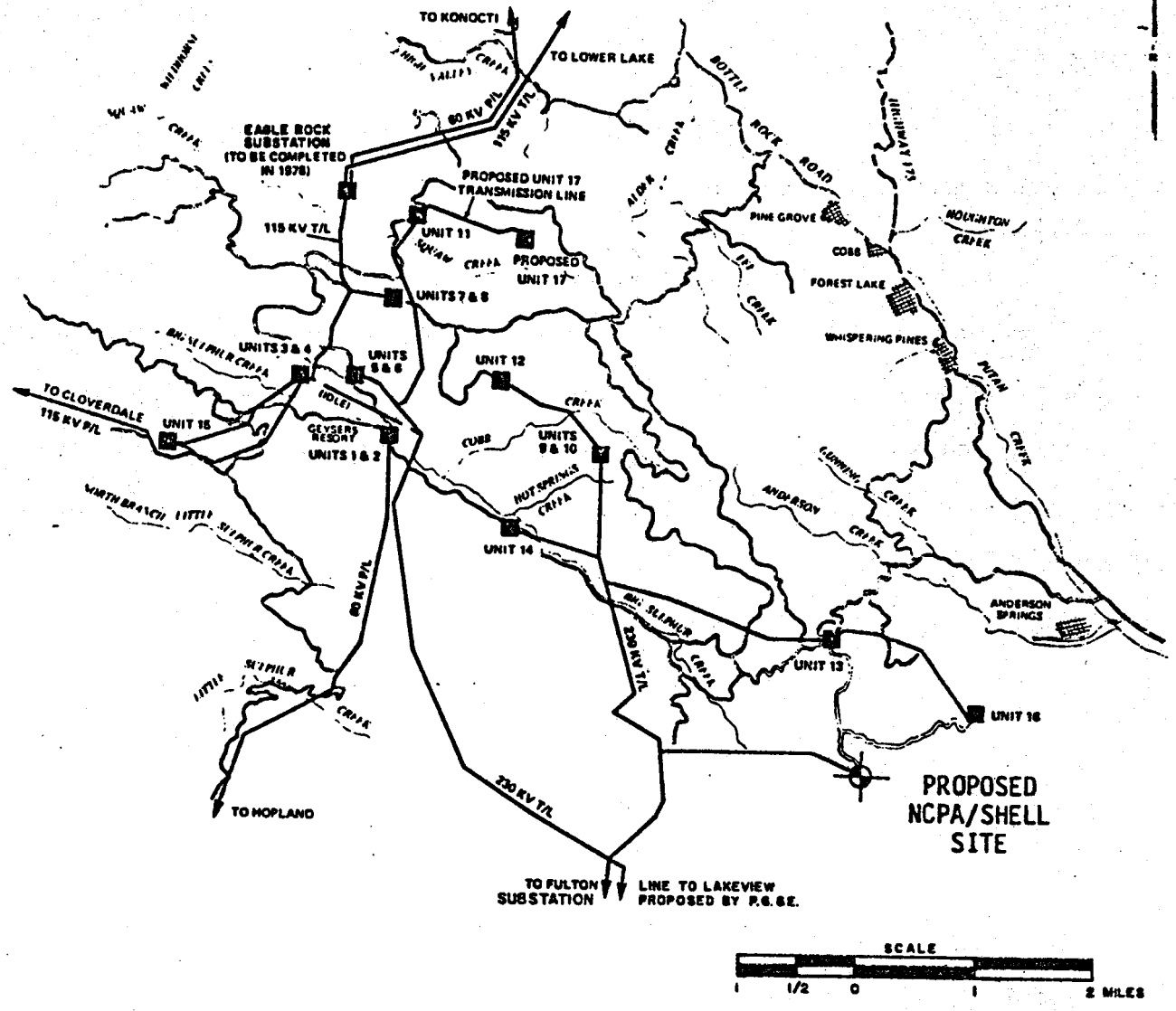
The Geothermal Project No. 2 which NCPA has proposed to construct on federally owned and leased lands in the Geysers area of Sonoma County is a dry steam geothermal power plant with a gross operating capacity of 110 Mw. It would consist of two 55Mw turbine/generator units and their auxillary equipment.

In addition to the turbine/generator units, the proposed power plant would include a condensing system, cooling tower, and substation. The two units could be operated independently, as well as in parallel with one another. The first unit would be scheduled for operation in November 1981, with the second unit coming on-line six months later.

It is anticipated that the proposed site would occupy approximately seven acres of level pad area. The major structures which would be built on the pad are the cooling tower, the hydrogen sulfide (H_2S) abatement facility, and the power house. The power house would enclose the steam turbines, electric generators, and supporting electrical and mechanical systems required for the generation of electrical power. A mechanical draft cooling tower would be used to dissipate heat from the power cycle. NCPA 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 exhaust gas stream would be ducted to the cooling tower.

The switchyard would step up the voltage of the electrical power from the generator level of 13.8kv to the 230kv level required for economical power transmission. NCPA proposes to construct a tapline that would intertie with PG&E's existing 230kv transmission system 2.1 miles west of the proposed NCPA site (see Map 1). The tapline would consist of nine double circuit latticed steel towers, with only one circuit strung initially. NCPA is currently negotiating with PG&E regarding "wheeling" the power from the proposed plant to NCPA's members via PG&E's transmission routes. These existing transmission routes apparently have the capacity to accommodate the additional power generated by the NCPA project, although PG&E has contended that additional

MAP 1



■ EXISTING OR PROPOSED PG&E UNITS
SOURCE: PG&E ENVIRONMENTAL DATA STATEMENT
GEYSERS UNIT 17 July, 1977

GEYSERS AREA TRANSMISSION LINES

Excerpted from: NCPA NOI, vol. I, p. V-14

capacity will be required by 1982 (see NCPA NOI, Vol. 2, p. 15-2). NCPA has stated that its intent is to utilize PG&E's existing system to transmit power from the Geysers, without foreclosing the possibility that expansion of the existing system by PG&E or others may nonetheless be required in the future (12/21/78 Transcript, pp. 41-2). NCPA is also considering alternative means of transmitting power from the Geysers area (see "Transmission Line", Finding Number 3 and Conclusion 1, Section IV.C., following).

2. The Site

The site is situated at approximately 3,200 feet elevation on a spur ridge of the Mayacmas Mountains, near the main ridge crest of these mountains. The junction of the ridges is near the headwaters of Big Sulphur Creek in Sonoma County and the headwaters of Bear and Dry Creeks in Lake County. The proposed site is approximately 700 feet southwest of the Lake-Sonoma County line, 5 1/2 miles east of Middletown, 13 miles northeast of Healdsburg, 14 miles north by northwest of Calistoga, and 22 miles southeast of Lakeport (see map 2).

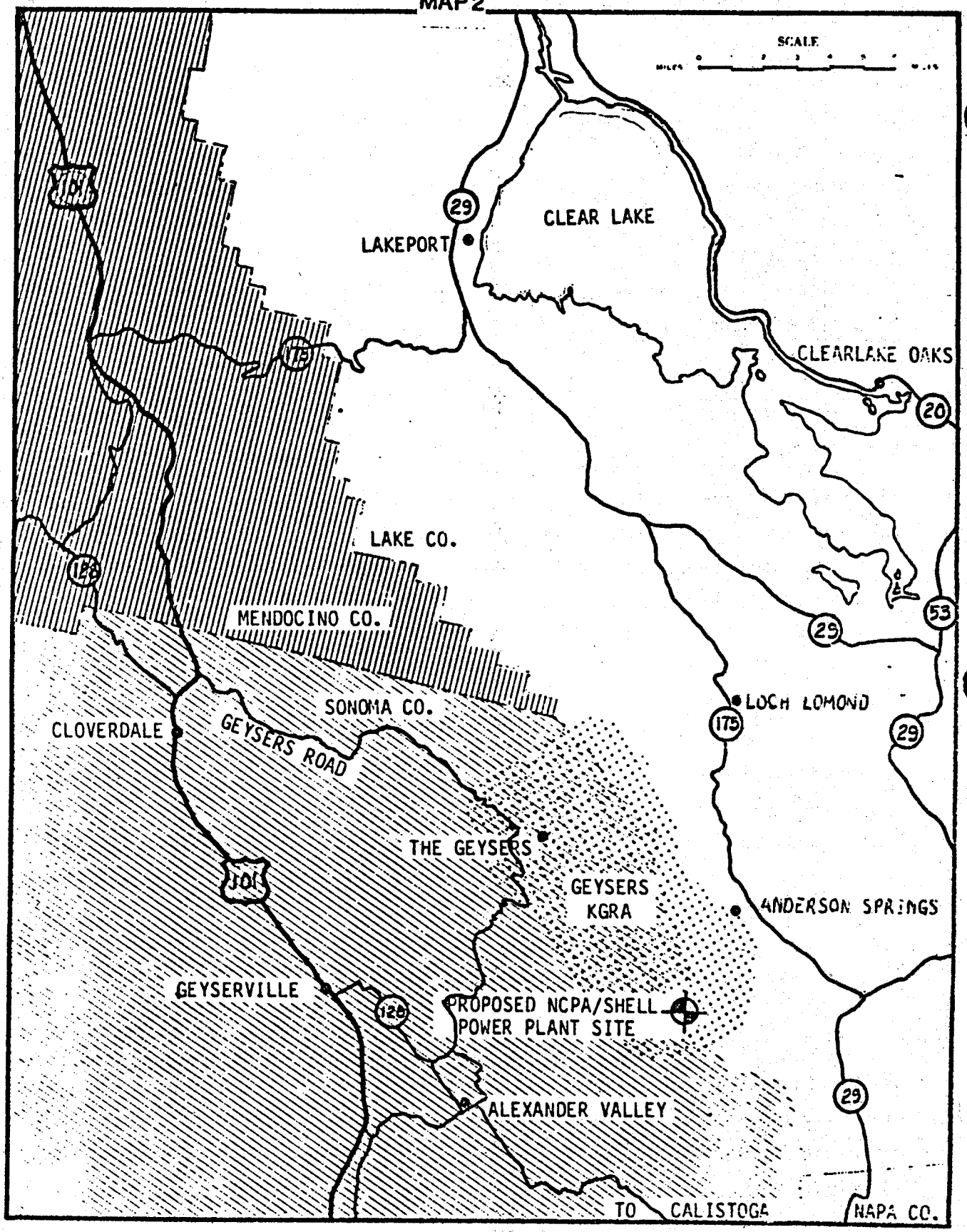
It would occupy approximately seven acres of level pad area, provided by altering the terrain in balanced cuts and fills (see Figure 1). Vehicle access to the site would be provided by existing roads; similar roads could be used for construction of approximately one-half of the transmission tie-line while additional spur roads will probably be necessary for construction of the remainder of the tie-line.

3. The Steam Field

A large reservoir of geothermal steam exists in the Geysers Known Geothermal Resources Area (KGRA; see Figure 2). 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 NCPA Geothermal Project No. 2, several other units are being planned by various power suppliers.

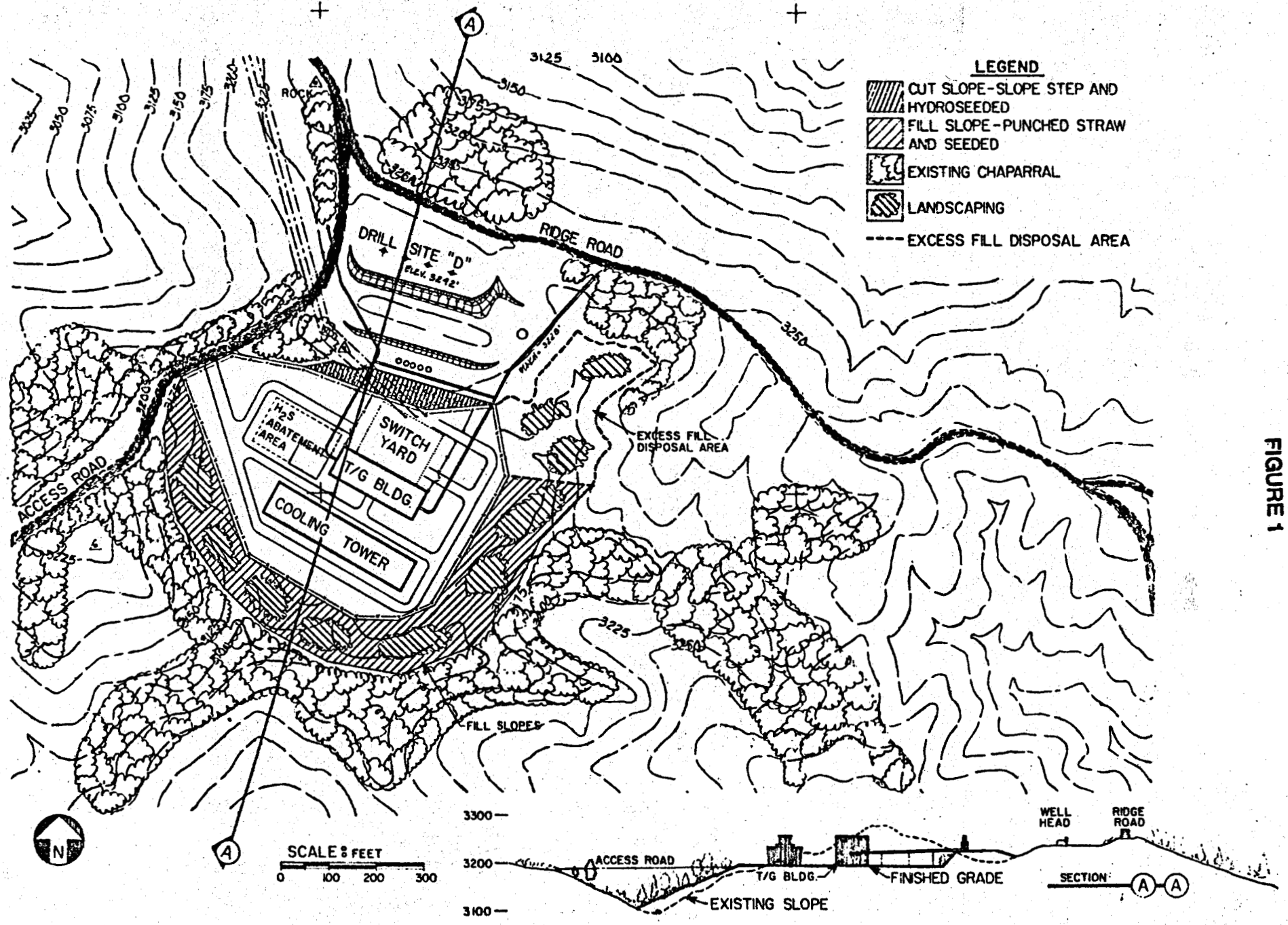
The steam supply field is located on Federal lands at the southeast extension of the Geysers area. Part of this steam field is in Lake County and part in Sonoma County. Five production wells have already been drilled and

MAP 2



GEYSERS AREA REGIONAL MAP

Original source: NCPA NOI, vol. I, p. I-2

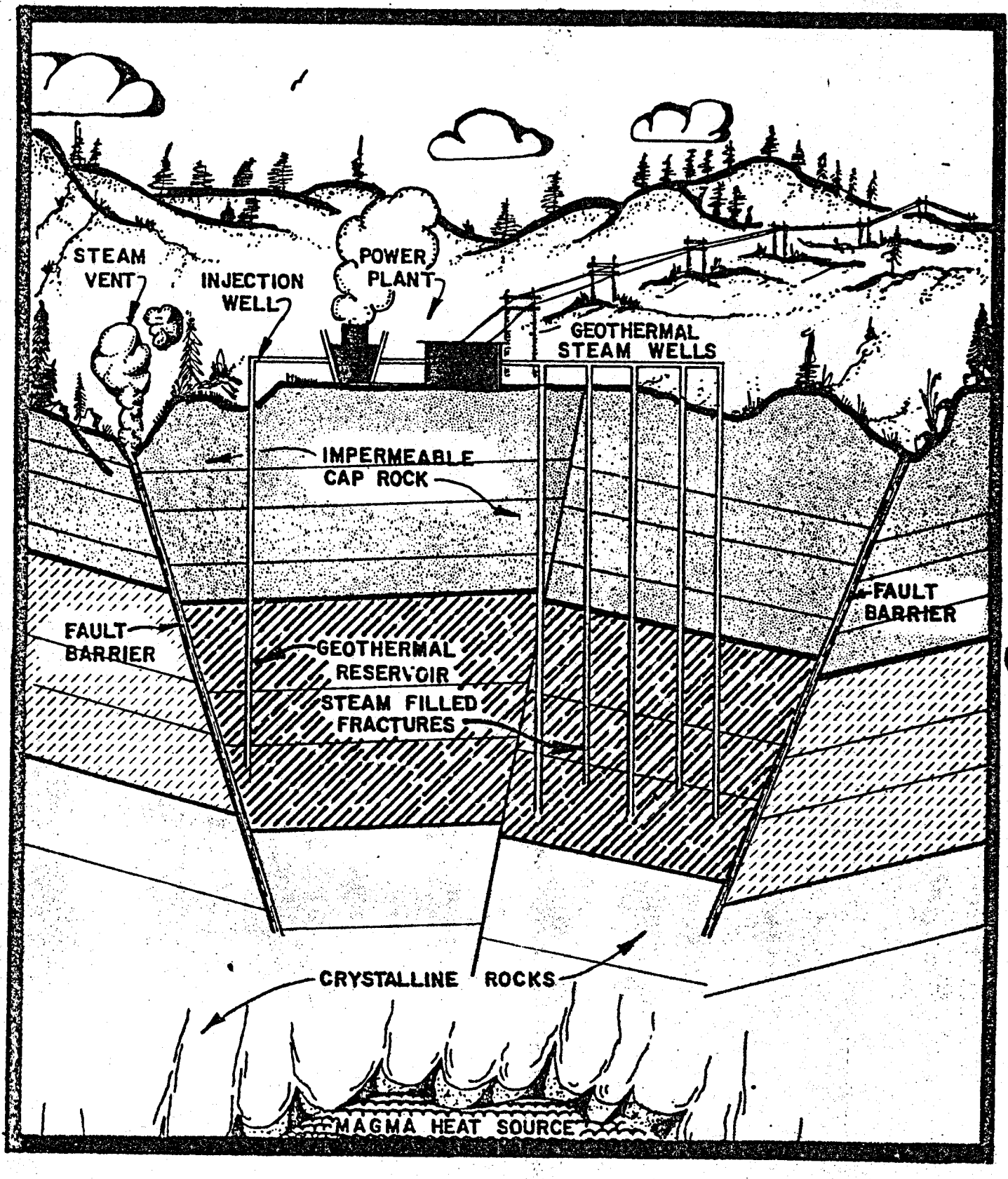


PLOT AND CONCEPTUAL LANDSCAPE PLAN

FIGURE 1

Original source: NCPA NOI, vol. 1, p. V-11

FIGURE 2



SIMPLIFIED GEOTHERMAL FIELD

Original source: NCPA NOI, vol. I, p. III-2

completed for the NCPA project, and the additional wells required would be drilled prior to completion of the proposed project (see Map 3). Based upon prevailing practices NCPA and Shell Oil, the steam developer, anticipate the need for a total of 20 wells using a 40-acre spacing per well to supply the initial demands of the 110 Mw plant. It is estimated tht an additional 10 wells could be needed over the next 30 years to compensate for declining steamflow in the original wells.

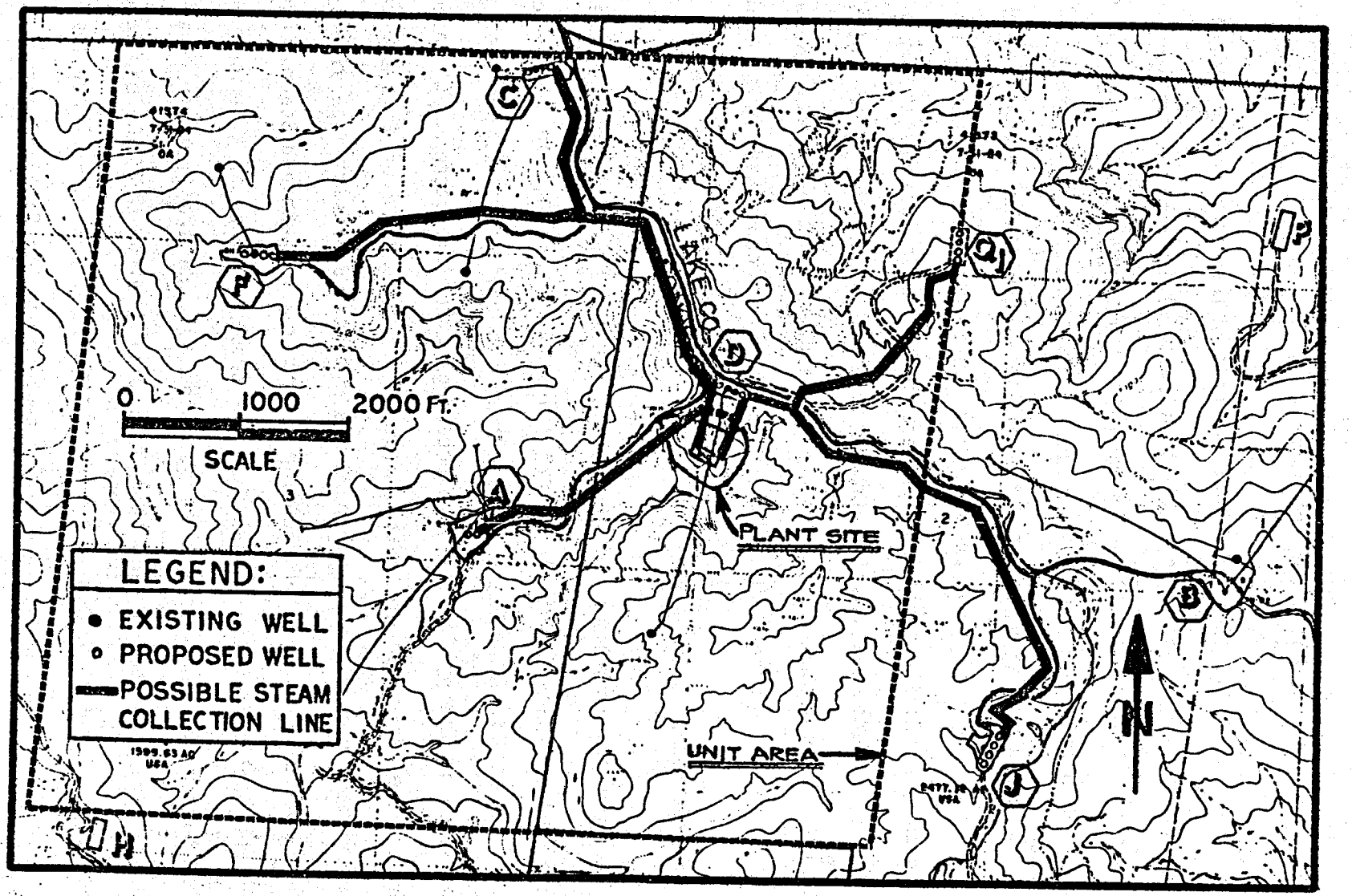
4. Authorization Required

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

	Regulatory Authority	Approval	Project Component
1.	Energy Resources Conservation and Development Commission (CEC)	Certification to Construct and Operate	Power Plant and Transmission Line
2.	United States Department of Energy (DOE)	Financing Guarantee	Percentage of Project Costs
3.	United States Geological Survey (USGS)	License for Use of Lands	Power Plant and Steam Field
4.	Bureau of Land Management (BLM)	Plan of Utilization for Surface	Power Plant Site and Transmission Line
5.	Northern Sonoma County Air Pollution Control District	Authority to Construct and Permit to Operate	Power Plant and Portion of Steam Field in Sonoma County
6.	Lake County Air Pollution Control District	Authority to Construct and Permit to Operate	Portion of Steam Field in Lake County
7.	Lake County Board of Supervisors	Conditional Use Permit*	Portion of Steam Field in Lake County
8.	Sonoma County Board of Supervisors	Conditional Use Permit	Portion of Steam Field in Sonoma County
9.	U.S. Environmental Protection Agency (EPA)	Prevention of Significant Deterioration (PSD)**	Power Plant and Steam Field

*The Lake County Board of Supervisors adopted a resolution on December 19, 1978 which obviates the need for a steam developer to obtain a county land use permit in order to conduct geothermal activities on Federally owned land. Since the steam developer, Shell Oil, is operating on Federally owned and leased lands, only a USGS license, and not a Lake County land use permit, is required (see Exhibit 15 in Appendix D; 12/21/78 Transcript, pp. 93-4; 1/22/79 Transcript, pp. 210-12).

**Federal and State authorities met on January 30, 1979, regarding the application of Federal PSD regulations to geothermal projects. The issue is not yet resolved, and the Committee hopes that final resolution will be reached in the course of future conferences.



STEAM FIELD DEVELOPMENT

Original source: NCPA NOI, vol. I, p. III-5

MAP3

C. Summary of the Proceedings to Date

1. Submittal of Notice of Intention

On August 11, 1978, the Northern California Power Agency (NCPA) filed with the Commission a Notice of Intention (Notice) to file an Application for Certification (Application) for its Geothermal Project No. 2 proposed to be located on Federal lands in Sonoma County. On August 22, 1978, the Executive Director of the Commission accepted the Notice as containing adequate technical data and information as required by Commission regulations to enable the Staff to begin analysis of the proposal. Subsequently, the Chairman of the Commission appointed a Committee, composed of Commissioner C. Suzanne Reed, Presiding, and Commissioner Alan Pasternak, to conduct proceedings on the Notice. A chronological account of events in these proceedings is contained in Appendix A.

2. Petitions to Intervene

To date, no members of the public, public agencies, or other persons or groups have sought leave to intervene in the proceedings on the NCPA Geothermal Project No. 2 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 December 22, 1978 to the Boards of Supervisors, Air Pollution Control Officers, and Planning Departments of Lake and Sonoma Counties specifically soliciting their views on the proposed project. Various public agencies have submitted comments on both the NOI and the Preliminary Report, and the Northern Sonoma County Air Pollution Control Officer participated substantially in the evidentiary hearing concerning the air quality issue. His concerns are reflected in the Air Quality section of this Final Report.

3. Procedural Conference

Since the proposed NCPA project would be located on Federally owned and leased lands, the Commission viewed coordination with the pertinent Federal agencies, i.e. the United States Geological Survey (USGS), the Bureau of Land Management (BLM), and the Department of Energy (DOE), as a necessity to ensure an efficient regulatory process. The Committee held a Procedural Conference with these Federal agencies on September 26, 1978, in Santa Rosa to discuss and clarify the manner in which the joint regulatory review process would be conducted. Interested persons and public agencies were encouraged to attend this Conference.

Pivotal to this joint regulatory review process, and a central item of discussion at the Procedural Conference, is the Memorandum of Understanding (MOU) among the Commission and the three Federal agencies. This document, which was officially signed on November 16, 1978 and included as "Appendix B" of the Preliminary Report, provides for mutual cooperation and review regarding the respective agencies' licensing requirements for the proposed project. Furthermore, the MOU provides for the preparation of a Joint Environmental Study on the proposed project sufficient to fulfill the Environmental Impact Report requirements of the Commission and the environmental review responsibilities of the involved Federal agencies. The Commission is designated as the lead agency in the preparation of this Study.

4. Issue Workshops

On September 21, 22, and 26, and on October 17, 1978, in Sacramento and Santa Rosa, the Commission staff held informal workshops to discuss issues and concerns related to the project with NCPA 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 for the proposed project; biological resources; noise; water quality; soils; hydrology and water resources; cultural resources; system engineering and design; transmission line; socio/economics; public health; and air quality. These subjects were addressed at a Prehearing Conference Statement Workshop on October 16 in Sacramento. The purpose of this workshop was for Commission staff and NCPA to attempt to prepare joint Findings of Fact and Conclusions on those issues which they believed would need no adjudication or investigation 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 workshop also provided members of the public and other interested agencies with an opportunity to propose Findings and Conclusions. Copies of the resulting Joint Prehearing Conference Statement of Findings and Conclusions (Joint Statement) were made available to the public on October 20, 1978.

5. Informational Hearings

Pursuant to Public Resources Code Section 25509, the Committee conducted public Informational Hearings on October 10, 1978 in Santa Rosa and in Kelseyville for the purpose of enabling Commission staff and NCPA 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 NCPA or make general comments or expressions of concern about the proposed project.

6. Prehearing Conference

On October 31, 1978, the Committee held a Prehearing Conference in Santa Rosa to consider the Staff's and NCPA's Joint Statement of Findings and Conclusions on all issues, and to identify areas of concern to those interested in the proceeding. The areas covered in the proposed, agreed-upon Findings and Conclusions were discussed and the Committee requested that those present state any intention to cross-examine any witnesses for NCPA or the Staff concerning any matter contained in the Proposed Joint Findings and Conclusions. In addition, the Committee provided an opportunity to state any intention to present a witness on any issue in subsequent evidentiary hearings. No one expressed an intention either to present or to cross-examine witnesses during any proceedings prior to issuance of the Preliminary Report, nor did anyone raise any specific or material objection to any of the Findings or Conclusions proposed by Staff and NCPA for adoption by the Committee. A representative of the U.S. Geological Survey indicated that his agency did not receive certain materials pertaining to the "Soils" portion of the Proposed Findings and Conclusions. The Committee directed the Staff to assure that the requested information was sent. The USGS representative indicated that comments would be forthcoming from his agency, and these have been included in Appendix C. The USGS will apparently make specific comments concerning the "Biological Resources" area after review of the detailed mitigation plan submitted by Applicant, and also desires additional drill pad related information. These concerns are discussed in Sections III. C.3. and C.8.

Following the Prehearing Conference, the Committee issued a Hearing Order on November 16, 1978, which acknowledged and accepted the verified Position Papers submitted by the Staff and the verified statements submitted by

NCPA in support of the Findings and Conclusions contained in the Joint Prehearing Conference Statement; notified the parties, concerned public agencies, and the public at large that no reason was apparent to hold the evidentiary hearings originally scheduled for November 16 to 24, 1978; and specified remaining actions to be taken and information to be submitted by the Staff and Applicant prior to issuance of the Preliminary Report.

7. Hearing on the Preliminary Report

On December 6, 1978, the Committee issued the Preliminary Report and a notice that a hearing on that Report would be held on December 21, 1978, in Sacramento. The Committee also set January 5, 1979 as the deadline for submitting comments on the Preliminary Report. During the December 21 public hearing, no party, Federal participant, public agency, or member of the public requested that the Committee hold evidentiary hearings to address any issue in the Preliminary Report, or any other issue. Nor did any written comment make such a request. Thus, the Committee determined that only one day of evidentiary hearings was required for the purpose of accepting the bases for Staff's and Applicant's positions into evidence. By a Notice and Order issued on December 22, 1978, the Committee scheduled an evidentiary hearing for January 22, 1979 in Santa Rosa. This Notice and Order apprised the parties of the purposes and procedures of the evidentiary hearing, gave guidelines as to acceptable offers of proof, and specifically directed the submission of certain evidentiary offerings and additional information. Although the first Notice and Order had stated the general procedures available should a party or Federal participant wish to cross-examine a witness for another party, the Committee issued a second Notice and Order on January 12, 1979, which more specifically dealt with offerings of proof and opportunity for challenge, rebuttal, and/or cross-examination of proponents of such offerings.

8. Evidentiary Hearing

The public evidentiary hearing was held on January 22, 1979 in Santa Rosa. There were no issues raised by Staff, Applicant, or any other participant to the proceeding which required formal adjudication by the Committee.

At the evidentiary hearing, both the Applicant and the Staff formally stated their respective positions concerning the areas identified in the Preliminary Report and reflected in the Proposed Findings and Conclusions therein; made formal offers of proof, subject to the opportunity for challenge, rebuttal, and/or cross-examination, supportive of their respective positions; proposed additional Joint Findings and Conclusions, supported by appropriate offers of proof, on the "Cultural Resources" and "Safety and Reliability" aspects of the project for Committee consideration (see Sections III.C.11. and IV.C.7); and formally stated their respective positions, accompanied by offers of proof, regarding actual or likely compliance of the proposed project with applicable local, regional, state, and federal standards, ordinances, and laws.

The Committee afforded the parties, Federal participants, interested public agencies, and members of the public an opportunity to object, question and/or comment upon each offer of proof and position asserted. No one present contested the positions asserted by the Applicant or Staff, or objected to the oral or written testimony, or other items offered into evidence (see Appendix D). The Northern Sonoma County Air Pollution Control Officer (NSCAPCO) did, however, express concerns regarding the Air Quality section of the Preliminary Report. Accordingly, the NSCAPCO discussed these concerns at the evidentiary

hearing and the Committee has taken them into consideration in formulating the Findings and Conclusions contained in the Air Quality section of this Final Report.

The evidentiary record was held open until January 31, 1979 at Staff's request. No additional submissions were received from the Staff; the Applicant did submit additional documents.

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 F 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 subject area 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 considered in the Notice of Intention proceeding is in conformity with the forecast of statewide and service area electric power demands adopted pursuant to Section 25309. The Commission's most recent forecast of statewide and service area electric power demands was adopted in March, 1977. This matter is also known as "determining the need for the project". With respect to the issue of need, the Commission staff and NCPA proposed the Findings and Conclusions set forth in subsection 3 of this section for adoption by the Committee. These proposed Findings and Conclusions, along with Committee Findings and Conclusions, appeared at pages 15 and 16 of the Preliminary Report.

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.

3. Comittee Findings and Conclusions

The Applicant and the Commission staff proposed Joint Findings and Conclusions on the conformity of the proposed project with the Commission's most recent demand forecast. These appeared at pages 15-16 of the Preliminary Report. In summary, the Staff's and Applicant's position is that the project is needed (1/22/79 Transcipt, pp. 111-24).

No one has challenged or objected to those Findings or Conclusions, either in written comment or during the course of the Preliminary Report or evidentiary hearings. Moreover, the evidentiary offerings by the Applicant and the Staff during the course of the latter hearing are sufficient to persuade the Committee that the Findings and Conclusions are well-founded (1/22/79 Transcript, pp. 111-24). The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

FINDINGS AND CONCLUSIONS
DEMAND FORECAST COMPLIANCE

Findings

1. It is the policy of the California Energy Commission to encourage the accelerated development of geothermal energy.

2. The Northern California Power Agency (NCPA) is an independent municipal agency formed to purchase, generate, distribute, sell and pool electrical energy between and for the benefit of the participating member cities who comprise the joint powers agency.

3. NCPA presently has no generating facilities of its own and has purchased all of its power from other suppliers including PG&E.

4. If constructed according to present schedules, NCPA Geothermal Project No. 2 will begin full commercial operation in May, 1982. This schedule represents approximately 44 months for the licensing-construction phase and assumes a twelve month NOI-AFC process.

5. The NCPA Geothermal Project No. 2 will generate baseload electricity and have a net generating capacity of 105.6 Mw.

6. The area served by the NCPA is within PG&E's service area.

7. The "most likely" demand forecast adopted by the Energy Commission, with adjustments, indicates a need in 1982 for additional generating capacity in excess of 105.6 Mw for the PG&E service area.

8. The NCPA Geothermal Project No. 2 is not included in PG&E's service area resource plan as submitted to the Energy Commission. This project would supply part of the capacity requirements of the PG&E service area beginning in 1982.

9. The U.S. Department of Energy and CEC Staff are jointly evaluating the proposed financing arrangements and relative costs for the NCPA plant in order to determine the relative merits of purchase power vs. self generated power. The results of the evaluation are to be filed with the Committee as soon as they become available.

Conclusions

1. The NCPA Geothermal Project No. 2 capacity addition is consistent with the current forecast of PG&E service area electric power demands adopted by the Commission pursuant to Public Resources Code, Section 25309.

2. If constructed and operated in compliance with applicable standards, ordinances, and laws, a geothermal power plant would be an acceptable means of supplying 105.6 Mw of the total capacity need for the PG&E service area in 1982.

3. Staff and Applicant agree that no adjudication of the issue is necessary in the NOI.

4. Points of Clarification

   The Committee understands that the financing arrangements referred to in Finding Number 9 will be submitted prior to or at the time of the AFC filing, should the full Commission approve the NOI. During the hearing on

the Preliminary Report, the Staff indicated that it was still performing its analysis of the financing situation, in conjunction with DOE (12/21/78 transcript, pp. 46-47).

Although some confusion was apparent at the evidentiary hearing, it still appears that the proposd project would be in commercial operation by May 1982, available for the summer peak of 1982 (1/22/79 transcript, pp. 115-6).

5. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section I 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 7 and 8, Conclusions 1 and 2; this being conformance with the Commission's most recently adopted demand forecast).

At the evidentiary hearing, the Applicant submitted oral and written testimony and accompanying documents supporting its position that the proposed project complies with the applicable laws (1/22/79 Transcript, pp. 111-22). The Staff also stated its position regarding the "need" area, and submitted written testimony to the effect that the proposed project will comply with applicable standards, ordinances, and laws governing this area (1/22/79 Transcript, pp. 123-4). No one has raised any objections or questioned the position of either party.

The weight of the evidence therefore leads the Committee to conclude that the proposed project complies with applicable ordinances, standards, and laws insofar as "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. No alternative sites were proposed during the proceedings on the proposed project and, therefore, the Findings and Conclusions set forth in the following subsections speak to the merit of the single site proposed for the NCPA Geothermal Project No. 2 power plant.

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

It was noted in the Preliminary Report that the Energy Commission and the Air Resources Board had undertaken negotiations in order to establish a comprehensive power plant siting scheme regarding the broad area of Air Quality. These negotiations have been completed and, on January 23, 1979, the two agencies 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 guided by this policy statement in adopting amended NOI/AFC regulations governing both geothermal power plant siting and the siting of power plants using other fuel types, and in other actions affecting compliance with Air Quality laws. 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 NCPA Notice, but should be applicable to the AFC if the NCPA Notice is approved.

Second, the Preliminary Report stated that the applicability of U.S. Environmental Protection Agency (EPA) Prevention of Significant Deterioration regulations was unsettled. This area remains so at the present, although the Committee understands that federal, state, and local authorities are engaging in a series of conferences directed toward clarifying this issue,* among others (1/22/79 Transcript, pp. 155-6). The Findings and Conclusions thus take the unsettled issue of PSD applicability into consideration, where appropriate.

Next, the Preliminary Report mentioned an apparent conflict between the ARB and the NSCAPCO regarding the interpretation of NSCAPCD Rule 455, specifically as to whether or not that rule preempts the BACT and trade-off provisions of Rule 230. Comments submitted by the ARB in the context of another proceeding before this Committee (PG&E Geysers Unit 17, 78-NOI-3) and docketed in the administrative record of this proceeding (12/21/79 Transcript, pp. 11-12; see Appendix C), indicates that this conflict is "more apparent than real". In essence, the ARB believes that the application of a BACT requirement would involve much more stringent emission controls than are required by the local control strategy of Rule 455, and that the District is in no way barred from requiring BACT on a new geothermal source.

*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 H_2S emissions from geothermal power plants.

In the ARB's view, the control strategy embodied in NSCAPCD Rule 455 is designed to achieve and maintain the H_2S standard while still allowing for the construction of new sources. This control strategy also establishes a timetable for reducing emissions from existing sources at an early enough date to allow for the forecasted growth in generating capacity, and sets emissions limits for these new sources at a level which allows attainment and maintenance of the ambient standard even with the new sources in operation. The control strategy of Rule 455 would also, in effect, require "community-wide" trade-offs to provide for the growth of geothermal developments.

Furthermore, the ARB has stated that although the District could issue a permit if the proposed project complied with the emissions limitations of Rule 455, it could also require more stringent controls if such controls constituted BACT. Since the BACT requirement is specifically intended to be made on a case-by-case basis, if the District is able to identify BACT as being a control technology which is more stringent than the categorical emissions limitations set forth in Rule 455, the District could condition the permit for the proposed project on the use of such technology. If compliance with Rule 455 alone will not prevent a local exceedance of the H_2S standard, the use of BACT may remedy this problem without requiring emissions trade-offs (sse Appendix C, ARB comments from Harmon Wong-Woo). The NSCAPO has stated that BACT "should mean the ability to achieve 8 gm/gross MWH or 99 percent level of abatement" (Appendix C).

3. Committee Findings and Conclusions

The Applicant and Commission staff proposed Joint Findings and Conclusions on the "Air Quality" and "New Source Review" areas. These appeared at pages 23-33 of the Preliminary Report.

The parties and the NSCAPCO have suggested certain amendments to the originally proposed Findings and Conclusions. The evidentiary offerings by the Applicant and Staff support their positions, and they raised no serious objection to the changes suggested by the NSCAPCO during the course of the evidentiary hearing. The Committee therefore adopts the following Findings and Conclusions for purposes of the Final Report:

FINDINGS AND CONCLUSIONS
AIR QUALITY

Findings - Emissions Limitations - Normal Power Plant Operation

1. The Applicant has stated that NCPA Geothermal Project No. 2 (hereafter referred to as "the NCPA power plant") is scheduled to begin operation in 1982.

2. The NCPA power plant will have a guaranteed gross generating capacity of 110 Mw.

3. At the time the NCPA power plant scheduled to begin operation, the hydrogen sulfide (H_2S) emissions must not exceed 100 grams/gross MWh (24.2 lb/hr.) pursuant to Northern Sonoma County Air Pollution Control District (NSCAPCD) Rule 455(b).

4. Beginning January 1, 1985, the NCPA power plant will be limited by Rule 455(b) to maximum H_2S emissions of 50 grams/gross MWh (12.1 lb/hr.). This emissions limitation is subject to review by the NSCAPCD before January 1, 1984.

5. The steam supply for the NCPA power plant will be approximately 2,000,000 lb/hr., with an H_2S content of 70 ± 20 ppm. This results in a total unabated H_2S flow rate of 100-180 lb/hr.

6. The Applicant has proposed to comply with the applicable H_2S emissions limitations by employing a surface condenser and Stretford H_2S abatement system.

7. Stretford systems, if correctly sized, have treated 99+ percent of that H_2S which reaches the system in the gas stream during petroleum refining, and should work equally well in treating H_2S from geothermal steam.

8. The Applicant has specified that the Stretford system will be designed with a sulfur handling capacity of 300 lb/hr., and thus the system is adequately sized for its intended use.

9. 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.

10. If the surface condenser at the NCPA power plant partitions less than 75-85 percent of the H_2S into the gas stream (depending on the H_2S concentration in the steam supply), the H_2S remaining in the steam condensate will require treatment if the plant is to comply with the 100 grams/gross MWh emissions limitation.

11. Since no existing geothermal power plant is utilizing a surface condenser, the partitioning efficiency of the surface condenser is not known. The Applicant estimates a partitioning efficiency of 90 percent.

12. PG&E Unit 15, which was scheduled to begin operation in December, 1978, will be the first Geysers power plant utilizing a surface condenser.

13. It is expected that at the time an AFC is filed for the NCPA power plant, sufficient operating data from PG&E Unit 15 may be available to determine the partitioning efficiency of the surface condenser. However, the extent to which the data from Unit 15 will apply to the proposed project is still unknown.

14. The Applicant has stated that it will install a condensate treatment system employing hydrogen peroxide and ferric sulfate either: (a) concurrently with the construction of the NCPA power plant in the event that operating data from Unit 15 indicates that the surface condenser partitioning efficiency is less than 75-85 percent; or (b) prior to January 1, 1985, if required to comply with the more stringent H_2S emissions limitation scheduled to take effect at that time.

15. In order to determine the appropriate time at which to install a condensate treatment system, the Applicant should, if the NOI is approved, file an AFC which contains sufficient operation data from PG&E Unit 15 to determine, with reasonable certainty, that the partitioning efficiency of the surface condenser will be adequate to meet the 100 grams/gross MWh H_2S emissions limitation.

16. NSCAPCD Rule 455(a) limits geothermal power plant emissions of sulfur compounds, calculated as sulfur dioxide, to 1000 ppm or less.

17. The NCPA power plant, as proposed in the NOI, will emit substantially less than 1000 ppm of sulfur compounds, calculated as sulfur dioxide.

18. NSCAPCD Rule 420(d) limits geothermal power plant emissions of particulate matter to whichever is lesser of:

    a. 0.20 grains per cubic foot (cf), or

    b. For a source with a process weight rate of 60,000 lb/hr. or more, 40 lb/hr.

19. Emissions of particulate matter from the NCPA power plant will be approximately 0.027 gr/cf in concentration, with a total emissions rate of approximately 3.03 lb/hr.

20. Federal Prevention of Significant Deterioration (PSD) Requirements may apply to the NCPA power plant. The Environmental Protection Agency (EPA) may require the NCPA power plant to employ Best Available Control Technology (BACT) for H_2S.

21. If the NCPA power plant can be operated in compliance with the H_2S emissions limitations of NSCAPCD Rule 455, the NCPA power plant may satisfy federal BACT requirements.

22. The EPA has prescribed PSD increments for SO_2 and for total suspended particulates (TSP).

23. Emissions of SO_2 from the NCPA power plant during normal power plant operation are not sufficient to require PSD review for SO_2.

24. Emissions of TSP from the NCPA power plant during normal power plant operations are not sufficient to require PSD review for TSP.

25. At present, no practical method for continuous monitoring of power plant operations exists which would provide information regarding a determination of compliance with NSCAPCD emission standards.

Findings - Emissions Limitations - Steam Stacking

1. The steam supplier states that during power plant outages of less than one week, the steam supplying the NCPA power plant will be "stacked" (vented)

at the steam release valve through a bank of rock mufflers. The amount of steam released at the steam release valve will be controlled through the use of automated flow control valves.

2. The NCPA power plant will employ dual 55 MW turbine/generators.

3. NSCAPCD Rule 455(b) is subject to review on or before January 1, 1982. Rule 455(b) presently limits H_2S emissions during periods of steam stacking as follows:

   a. For an unscheduled outage of a single unit, H_2S emissions must be limited to 10 percent or less of the H_2S contained in the steam supply at full unit load within four hours of the outage; or

   b. for an unscheduled outage of both units of a dual unit system, H_2S emissions must be limited to 50 percent or less of the H_2S contained in the steam supply for both units at full power plant load within four hours of the outage; or

   c. H_2S emissions at the steam release valve may not exceed 15 kg/hr.

4. The emissions reductions specified above must be achieved within one hour of a scheduled outage.

5. The steam supplier proposes to comply with the H_2S stacking emissions limitations of NSCAPCD Rule 455(b) through the use of "automated" flow control valves located in the flow lines of all supply wells and remotely controlled from a central point located at or near the power plant.

6. The ability of the steam supplier to comply with the H_2S stacking emissions limitations of Rule 455(b) through the use of automated flow control valves has not been demonstrated.

7. The Applicant should, at or prior to the time an AFC is filed, obtain and provide detailed information from the steam supplier demonstrating the engineering feasibility of the automated flow control valve to reduce H_2S emissions as required by Rule 455(b).

8. NSCAPCD Rule 455(a) limits emissions of sulfur compounds, calculated as SO_2, to 1000 ppm during periods of steam stacking.

9. Emissions of sulfur compounds, calculated as SO_2, will be substantially less than 1000 ppm during periods of steam stacking.

10. NSCAPCD Rule 420(d) limits emissions of particulate matter during periods of steam stacking to whichever is lesser of:

    a. 0.20 grains/cF; or

    b. 40 lb/hr.

11. Emissions of particulate matter during periods of steam stacking will be less than either:

    a. 0.20 gr/cF; or

    b. 40 lb/hr.

12. Pursuant to federal PSD regulations, BACT may be required.

13. If the steam supplier complies with the emissions limitations of Rule 455(b), federal BACT requirements may be satisfied.

14. The EPA has prescribed PSD increments for SO_2 and TSP.

15. Emissions of SO_2 from the steam release valve will be less than that required for PSD review.

16. Emissions of TSP from the steam release valve will be less than that required for PSD review.

17. At present no practical method for continuous monitoring of steam stacking operations exists which would provide information regarding a determination of compliance with NSCAPCD emission standards.

Conclusions - Emissions Limitations

1. If the Applicant files an AFC for the NCPA power plant, it shall include either:

   a. Sufficient operating data on the surface condenser partitioning efficiency from PG&E Unit 15 to determine, with reasonable certainty, that the NCPA power plant will meet the 100 g/MWh H_2S limitation of NSCAPCD Rule 455(b) without condensate treatment; or

   b. Specific proposals for condensate treatment systems which will be installed prior to the commercial operation of the NCPA power plant in the event that the partitioning efficiency of the surface condenser is not sufficient to meet the 100 g/MWh limitation.

2. The NCPA power plant, as proposed in the NOI, will comply with applicable emissions limitations for all pollutants, with the possible exception of H_2S emissions limitations, during normal power plant operation.

3. The NCPA power plant, as proposed in the NOI, will comply with federal PSD requirements during normal power plant operation, assuming such requirements apply.

4. The Applicant shall, at or prior to the time an AFC is filed, obtain and provide from the steam supplier detailed information demonstrating the ability of the automated flow control valve to reduce H_2S stacking emissions as required by Rule 455(b).

5. Emissions from the steam release valve, during periods of steam stacking, will comply with applicable emissions limitations, with the possible exception of H_2S emissions limitations.

6. Emissions from the steam release valve during periods of steam stacking will comply with federal PSD requirements, assuming such requirements apply.

7. The Applicant shall, prior to or at the time an AFC is filed, present a specific proposal detailing the way in which information, adequate for determining compliance with air pollution emission standards under conditions of normal power plant operation and steam stacking, will be provided.

8. Applicant and Staff agree that no adjudication of this issue is required in the NOI.

4. Points of Clarification - "Air Quality"

First, the Staff has stated that the "75-85 percent" partitioning referred to in Finding Number 10 of "Emissions Limitations - Normal Power Plant Operation" is not an expression of the level of abatement required for the

proposed project, but rather refers only to the amount of partitioning which would be required in order to meet the 100g/MWh limitation of NSCAPCD Rule 455(b) with the Stretford unit alone. Should the air quality analysis indicate that the plant as proposed could not meet the 100g/MWh limitation without causing or contributing to an air quality violation, then a higher degree of control would be required (12/21/78 Transcript, p. 13). The Applicant has stated that the plant can meet existing air quality standards, regardless of the partitioning efficiency, by the application of condensate H_2S abatement techniques if necessary (1/22/79 Transcript, p. 131).

Second, as mentioned in the Preliminary Report, a question still remains regarding the date of availability of data from PG&E Unit 15 (refer to Findings 12 and 13 under "Emissions Limitations - Normal Power Plant Operation", Conclusion 1 of "Emissions Limitations"), because of that Unit's delayed start-up. The parties are aware that such data may be lacking, and the Applicant, as noted in Conclusion 1, will be prepared to provide alternative proposals should the Unit 15 data be unavailable (1/22/79 Transcript, pp. 171-2). Also, at the evidentiary hearing, the Northern Sonoma County Air Pollution Control Officer raised concerns that the data from Unit 15, even if available, may not be wholly applicable to operations of the proposed project. He suggested adding language so indicating. His concern is reflected in the last sentence of Finding Number 13 ("Normal Power Plant Operation"). The Applicant and the Staff agreed with the NSCAPCO's concerns and, even though both parties felt such concerns had been covered in existing language, raised no objections to further specificity (1/22/79 Transcript, pp. 135-41).

Third, as mentioned in Section III.B.2., preceeding, the scope of Federal Prevention of Significant Deterioration (PSD) regulations and determination of BACT is currently the subject of discussion. Because of this,

use of the word "may" is more appropriate than "will". Insofar as these requirements could interact with NCSAPCD Rule 455, the NSCAPCO is in agreement with the language change (Findings 20 and 21 "Normal Power Plant Operation; Finding 13 "Steam Stacking"; 1/22/79 Transcript, pp. 142-3).

Fourth, the NSCAPCO stated at the evidentiary hearing that there is no practical way of determining regular compliance with the emissions standard under either normal power plant operation or conditions of steam stacking (1/22/79 Transcript, pp. 143-5). In the course of the ensuing discussion, all participants were in basic agreement that, at present, the establishment of a continuous monitoring method to ensure compliance with NSCAPCD Rule 455(b) is not feasible (1/22/79 Transcript, pp. 143-9). In order to meet with these concerns, and in acknowledgement of the spirit of Public Resources Code section 25532, which requires the Commission to establish a monitoring system that will assure compliance of the certified facility with applicable standards, ordinances, and laws, the Committee has adopted Finding 25 ("Normal Power Plant Operation"), Finding 17 ("Steam Stacking"), and Conclusion 7 for purposes of the NOI.

FINDINGS AND CONCLUSIONS
AIR QUALITY
NEW SOURCE REVIEW

Findings

1. Rule 220(b)(1) of the Northern Sonoma County Air Pollution Control District requires an air quality analysis for any new source which will emit more than 25 lb/hr. or 250 lb/day of any pollutant for which there is a state or national ambient air quality standard.

2. The NCPA power plant will emit more than 250 lb/day of H_2S during normal power plant operation.

3. The NCPA power plant steam release valve may emit more than 25 lb/hr of H_2S during periods of steam stacking for up to 4 hours during an unscheduled outage and up to 1 hour during a scheduled outage.

4. The state ambient air quality standard for H_2S is 0.03 ppm averaged over 1 hour. This standard may not be equalled or exceeded. There is no federal ambient air quality standard for H_2S.

5. Ambient H_2S concentrations in the Geysers KGRA and in the vicinity of the NCPA power plant have exceeded 0.03 ppm.

6. NSCAPCD Rule 230(c) requires denial of an Authority to Construct for a geothermal power plant if emissions from such power plant will prevent the attainment, interfere with the maintenance, or cause a violation of any state or national ambient air quality standard.

7. Notwithstanding the provisions of NSCAPCD Rule 230(c), conditional approval of an Authority to Construct is permissible pursuant to Rule 230(d) if:

   a. the new source employs BACT;

b. Emissions reductions from existing sources are obtained which result in a net reduction in total emissions from the new source and such existing sources;

c. The emissions reductions specified above will provide a net air quality benefit; and

d. All existing sources owned or controlled by the Applicant are in compliance with all applicable rules, regulations, and approved compliance schedules.

8. The Applicant does not own or control any existing sources in the Geysers.

9. NSCAPCD Rule 455, adopted in June 1978, is an H_2S compliance schedule requiring specified reductions in H_2S emissions from new and existing sources to achieve a gradual reduction in ambient H_2S concentrations so that the H_2S ambient air quality standard will be attained and maintained as of January 1, 1985.

10. Because of the provisions of NSCAPCD Rule 455, the requirements of Rules 230(c) and (d) do not apply unless the new source will prevent the attainment, interfere with the maintenance, or cause a violation of the H_2S ambient air quality standard after January 1, 1985. Thus, the Applicant must achieve emissions reductions greater than those required pursuant to Rule 455 if the new source would interfere with the H_2S control strategy contemplated by Rule 455.

11. The air quality analysis provided by the Applicant in the NOI is inadequate to determine if H_2S emissions from the NCPA power plant will prevent the

attainment, interfere with the maintenance, or cause a violation of the H_2S ambient air quality standard during normal power plant operation and during periods of steam stacking.

12. The Applicant has agreed to perform an additional air quality analysis prior to or at the time of filing the AFC. Such analysis should consider maximum impact at points of sensitive receptors. This analysis should:

    a. Assess impacts of normal plant operation and of steam stacking during plant shutdown; and if the impact on ambient H_2S concentrations exceeds 1.0 ppb;

    b. Assume a background H_2S concentration for the initial year of operation that is consistent with all applicable source emissions limitations contained in NSCAPCD and Lake County APCD Rules which are in effect at the time of filing the AFC.

13. If the analysis described in Finding 12 shows a violation of the H_2S standard at sensitive receptors, the Applicant may provide a similar analysis assuming a background H_2S concentration consistent with source emissions from existing sources and those currently under construction which comply with emission reductions required by January 1, 1985, the date at which NSCAPCD rules are intended to achieve the ambient air quality standard for H_2S.

14. The Applicant has agreed to perform the analysis identified in Findings 12 and 13 for the following meteorological conditions:

    a. nocturnal drainage;

b. Subsidence inversion with an inversion base of not less than 3500 feet (MSL);

c. Downwash;

d. Those conditions present during the highest H_2S concentrations recorded at Anderson Springs, Anderson Ridge, and Whispering Pines; and

e. Those conditions present during days having the highest number of H_2S exceeds at the Anderson Springs, Anderson Ridge, and Whispering Pines monitoring stations.

15. The Applicant has proposed to conduct an air quality and meteorological study to provide data sufficient to adequately perform the analyses as specified in Findings 12, 13, and 14 as follows:

a. For the meteorological conditions stated in Finding 14 as "nocturnal drainage" and "downwash", tracer studies performed during such meteorological conditions, or a correlation study to determine the applicability of Unit 16 tracer release data, Unit 17 tracer release data, Unit 13 tracer release data, data contained in The Geysers Geothermal Area Emissions and Aerometric Data Set (1976-1977), ERT Document No. P-5324, prepared for The Geysers Geothermal Environmental Committee, August, 1978 (hereafter "the GGEC tape"), and any other data deemed relevant by the Applicant to the NCPA power plant site;

b. For the meteorological condition stated in Finding 14 as "subsidence inversion with an inversion base of not less than 3500 feet (MSL)" (hereafter "limited vertical mixing"), tracer study performed during a

period of limited vertical mixing or, although not preferred, a correlation of physical and meteorological characteristics at the Unit 17 site to the NCPA site and application of a model validated for use at the Unit 17 site; and

c. For those meteorological conditions stated in Finding 14 as "conditions (d) and (e)", a review of the GGEC tape and other data deemed relevant by the Applicant to verify Staff's belief that such conditions have occurred during periods of limited vertical mixing.

16. Information from the proposed study will not be available to perform the analyses specified in Findings 12, 13, and 14 during proceedings on the NOI for the NCPA power plant.

17. With the possible exception of the H_2S standard, the NCPA power plant as proposed in the NOI will not prevent the attainment, interfere with the maintenance, or cause a violation of any applicable ambient air quality standard.

Conclusions - New Source Review

1. With the possible exception of emissions of H_2S, the NCPA power plant will, during normal power plant operation, comply with applicable ambient air quality standards.

2. With the possible exception of emissions of H_2S, emissions from the steam release valve will, during periods of steam stacking, comply with applicable ambient air quality standards.

3. The Applicant shall perform the air quality analyses described in Findings 12, 13, and 14 (New Source Review), and shall provide the results of such analyses at or prior to the filing of the AFC for the NCPA power plant.

4. The Applicant shall conduct the air quality and meteorological study described in Finding 15 (New Source Review), and shall provide the results at or prior to the filing of the AFC.

5. Applicant and Staff agree that no adjudication of this issue is necessary in the NOI.

5. Points of Clarification - "New Source Review"

At the hearing on the Preliminary Report, the Applicant indicated that submission of Air Quality analysis would be delayed past its originally anticipated date of December 31, 1978 (12/21/78 Transcript, p. 5). In the ensuing discussion, it was revealed that Applicant had decided to conduct site-specific tracer studies for the meteorological conditions of subsidence inversion and downwash referred to in Finding 14, and had not decided upon the method for the drainage study (12/21/78 Transcript, pp. 13-15). The Staff indicated that the proposed tracer studies were preferable to a correlation study. In view of the study methods, Applicant and Staff agree that submission of the air quality analyses prior to or at the filing of an AFC is acceptable (1/22/79 Transcript, pp 90-1; refer to Finding 16; Conclusion 4).

At the evidentiary hearing, the NSCAPCO raised concerns regarding the availability of monitoring data on ambient H_2S concentrations. Such data is provided for under the "Public Health" Findings and Conclusions (Finding 13 ; Conclusion 3 ; pp. 75-6 of this Report), and the APCO desired to know whether

such data would be available for air quality New Source Review purposes, including whether existing monitoring programs would be continued. In response to these concerns, the Applicant stated that Anderson Springs was within the "local population" referred to in Conclusion 3 of "Public Health" (page 76), and that the public health monitoring program would provide data which could be utilized for air quality concerns (1/22/79 Transcript, pp. 165-70).

Finally, the NSCAPCO mentioned the existence of a possible 30 lb/hr. H_2S tradeoff in the Geysers in the form of an uncontrolled venting well, the practicability of which the Applicant may wish to explore (1/22/79 Transcript, pp. 149-53).

6. Conformity with Applicable Standards, Ordinances, and Laws - Air Quality and Air Quality New Source Review

On pages 20-22 and in Appendix F, Section X, of the Preliminary Report, the Committee identified certain laws, standards, and ordinances as being tentatively applicable to the proposed project insofar as the areas of "Air Quality" and "Air Quality New Source Review" were concerned.

At the evidentiary hearing, the Applicant stated its position and submitted oral and written testimony and accompanying documents supporting its position on the proposed project with respect to the air quality and New Source Review areas. 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 these subject areas. A summary of the parties' positions regarding conformity follows:

Standard, Ordinance, or Law	Applicant Position	Staff Position
a) NSCAPCD Rule 455(b) (applicable beginning 1/1/80) 100 grams/gross megawatt hour (g/GMh) of hydrogen sulfide (H_2S).	reasonable likelihood of compliance	compliance substantially likely, with appropriate conditions dependent upon receipt of additional information
b) NSCAPCD Rule 455(b) (applicable beginning 1/1/85) 50 g/GMh H_2S.	reasonable likelihood of compliance	same as (a)
c) NSCAPCD Rule 455(a), 1000 parts per million (ppm) or less of sulfur compounds, calculated as sulfur dioxide (SO_2).	will comply	will comply
d) NSCAPCD Rule 420(d), limits emissions of particulate matter to the lesser of: 0.20 grains per cubic foot (gr/cf), or 40 lb/hr. from a source with a process rate of 60,000 lb/hr.	will comply	will comply
e) EPA Prevention of Significant Deterioration (PSD) for H_2S	application questionable, but BACT will be used	can comply by using BACT, but determination of BACT must be made at AFC
f) NSCAPCD Rules 220 and 230, new source review rules.	reasonable likelihood of compliance	same as (a)
g) NSCAPCD Rules 400(a) [Nuisance] and 540 [Control Breakdown].	shall comply	same as (a)

h) NSCAPCD Ambient Air Quality Standards

Pollutant	California Standard	Averaging Time	Applicant Position	Staff Position
H_2S	0.03 ppm	1 hour	reasonable likelihood of compliance	same as (a)
SO_2	0.05 ppm	24 hours	will comply	will comply
	.5	1 hour		
Sulfates	25 ug/m^3	24 hours	reasonable likelihood of compliance	will comply
TSP	60 ug/m^3	Annual geo-metric mean	will comply	will comply
	100 ug/m^3	24 hours		

No one has raised any objections or questioned the position of either party as set forth above (1/22/79 Transcript, pp. 128-72).

The Committee therefore concludes that there is a substantial 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 feels 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. Committee Findings and Conclusions

The Applicant and the Commission staff proposed Joint Findings and Conclusions on Biological Resources, Noise, Water Quality, Soils, Hydrology and Water Resources, Cultural Resources, and Socio-Economics. These appeared at pages 35-52 of the Preliminary Report.

With the exception of the Cultural Resources area, no one has substantially challenged or objected to these Findings and Conclusions, either in written comment or during the course of the Preliminary Report or evidentiary hearings. Because of the submission of additional data, the Applicant and Staff have agreed upon Cultural Resources Findings and Conclusions different from those contained in the Preliminary Report. The evidentiary offerings by the Applicant and the Staff at the evidentiary hearing persuade the Committee that the Findings and Conclusions on the seven above mentioned subject areas are well founded, including the revised version pertaining to Cultural Resources. The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

FINDINGS AND CONCLUSIONS
BIOLOGICAL RESOURCES

Findings

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

   - o Endangered Species Act of 1973 and implementing regulations.
   - o Ecological Reserve Act of 1968 and implementing regulations.
   - o Endangered Species Act of 1970 and implementing regulations, Fish and Game Code sections 2050-2055.
   - o California Fish and Game Code sections 3511, 4700, 5000, 5050, 5515, and implementing regulations.
   - o California Species Preservation Act of 1970, Fish and Game Code sections 900-903.

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 NCPA site.

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

6. There are no other rare, threatened, or endangered wildlife species known to exist at the NCPA site.

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

8. The Golden Eagle and the Ringtail Cat have been observed in the Geysers-Calistoga Known Geothermal Resource Area.

9. The NCPA site is not known to be a significant breeding or feeding area for either the Golden Eagle or the Ringtail Cat.

10. There is a water seep located at the south-east portion of the plant site which is believed to be an area of critical concern. In preparing and filing the detailed mitigation plan as specified by Finding 12, the Applicant shall evaluate the nature and significance of the seep and identify any mitigation measures it proposes to utilize for the protection of the seep.

11. Species of recreational value are known to exist on or near the NCPA site.

12. The Applicant has indicated numerous mitigation measures in the NOI which could be implemented to reduce on-site impact to biological resources, but did not specify how they would be implemented. The Applicant has agreed to submit a detailed mitigation plan, which will specify the mitigation measures it proposes to utilize, including the schedule for implementation and relative location, size and configuration. The plan is scheduled to be completed by February 5, 1979. The Staff shall report to the Committee

after it has reviewed the Applicant's submittal and shall make its recommendation as to the need for additional or differing mitigation measures.

13. Vegetation stress has occurred from cooling tower drift at The Geysers. The Staff inquired of the Applicant regarding the effects of cooling tower drift on vegetation. The Applicant responded by submitting data on the effect of cooling tower drift on December 15, 1978. The Staff shall report to the Committee after it has reviewed the Applicant's report and shall make such recommendations as may be necessary.

Conclusions

1. The Applicant shall provide the data requested in Findings 10, 12, and 13, in accordance with the schedules outlined in the Findings.

2. Subject to the receipt of additional data, the NCPA power plant and related facilities can be constructed and operated in compliance with the applicable standards for the protection and preservation of biological resources.

3. Staff and Applicant agree that no adjudication of this issue is necessary in the NOI.

3. Points of Clarification

The Staff has stated that, based on existing information, there are no apparent difficulties with regard to impacts of the proposed project on rare or endangered plants or wildlife species. The U.S. Fish and Wildlife Service and the California Department of Fish and Game have advised the Staff that certain rare and endangered plants known to exist in the Geysers area may be

demonstrated to exist in the vicinity of the proposed project by the results of the detailed biological resources mitigation plan to be submitted by the Applicant (12/21/78 Transcript, pp. 35-37, 1/22/79 Transcript, p. 182). The Staff will evaluate such concerns, should they be demonstrated in the mitigation plan.

Certain public agencies, including USGS, have expressed concerns regarding the area of biological resources (Appendix C). It is the Committee's understanding that the Applicant's detailed mitigation plan will deal with many of these concerns, and that they will also be covered in the Environmental Impact Report. The Staff is in the process of developing generic proceedings to deal with broader biological resources concerns--specifically cumulative impacts of geothermal development and compensation for habitat loss--frequently raised by public agencies in the course of this and other Geysers area siting cases (1/22/79 Transcript, pp. 177-82).

4. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section II of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding the area of "Biological Resources":

- Endangered Species Act of 1973 and implementing regulations (Findings 1-13; Conclusions 1 and 2).
- Ecological Reserve Act of 1968 and implementing regulations (Findings 1-13; Conclusions 1 and 2).
- California Endangered Species Act of 1970 and implementing regulations, Fish and Game Code sections 2050-2055 (Findings 1-13; Conclusions 1 and 2).
- Fully Protected Species Act, California Fish and Game Code sections 3511, 4700, 5000, 5515, and implementing regulations (Findings 1-13; Conclusions 1 and 2).

At the evidentiary hearing, the Applicant submitted oral and written testimony and accompanying documents supporting its position that the proposed project will comply with the above laws, and further indicated that a detailed erosion control and wildlife mitigation plan would be submitted by February 5, 1979. The Staff also stated its position regarding the "Biological Resources" area, and submitted written testimony that the proposed project will comply with the above laws, standards, and ordinances, assuming adequate mitigation measures are implemented where appropriate (1/22/79 Transcript, pp. 172-82). 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 substantial likelihood that the proposed project will comply with applicable law. A final determination depends upon the results of the evaluation of the mitigation plan. This condition does not, however, impair acceptability for the purposes of the NOI.

FINDINGS AND CONCLUSIONS
NOISE

Findings

1. Lake and Sonoma Counties have adopted noise elements to their general plans. The intent of the Lake County noise element is to limit noise to 55 dBA Ldn. Certain construction activities, such as the movement of heavy equipment during daylight hours, are exempt from Lake County noise standards. The Sonoma County element does not have specified dBA limits. The noise limits are set in the Sonoma County use permits.

2. The state noise limits are established by CAL-OSHA, 8 Cal. Admin. Code sections 5095-5099 and Cal. Vehicle Code section 23130.

3. The Federal standards are set by the Occupational Safety and Health Act of 1970 and by the USGS Geothermal Resources Operational Order #4.

4. The ambient noise levels of the site and sensitive receptors are contained in the NOI in Volume 2, Appendix C, Table 8-3.

5. The closest identified sensitive residential receptor to the NCPA plant site is 1.23 miles north of the site. Based upon the estimated projected project operational noise level to this receptor, the sounds of operation should be inaudible at this receptor. The projected operating noise level would also be inaudible to the other identified sensitive receptors which are farther distant than 1.23 miles.

6. The third octave band noise frequency data for the cooling tower, steam jet ejector, and turbine generator are provided in figures 8.3, 8.4 and 8.5

of the NOI. Certain tonalities from the steam jet ejector and turbine generator are expected to be discernible at the plant, but due to molecular absorption, terrain, and vegetation barrier effects, it is not expected that these tonalities will be observed at the receptors. No discernible tonalities are expected from the cooling tower.

7. The highest plant construction noises will be caused by large earth moving equipment. The noise associated with this equipment will be discernible to some of the closest receptors. However, it is proposed that the activity will be temporary in nature and performed during daylight hours.

8. NCPA 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, wherever necessary.

9. A representative list of typical noise sources and levels associated with steam supply activities is 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).

10. 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 would not be discernible to sensitive receptors.

11. 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.

Conclusions

1. The power plant noises during normal operations should be inaudible to the closest receptor to the power plant site.

2. Power plant noises during normal operations will be in compliance with Lake and Sonoma Counties' noise standards and with the requirements of CAL-OSHA and with Federal standards.

3. Noises during periods of steam stacking will be inaudible to the closest receptors to the power plant site with the use of rock mufflers.

4. Noises during periods of steam stacking will be in compliance with Lake and Sonoma Counties' noise standards and with the requirements of CAL-OSHA and with Federal standards.

5. Noises caused by steam field operations other than steam stacking will be generally discernible to the local receptors, but such noises are infrequent and within the tolerable range.

6. Noises caused by construction of the power plant and related facilities could be discernible to some of the receptors closest to the power plant site, but will be in compliance with Lake and Sonoma Counties' noise standards and CAL-OSHA requirements and Federal standards.

7. 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 noises caused by plant construction will be tolerable to local receptors.

8. No adjudication of issues related to the impacts of noises caused by power plant construction and operation is anticipated in the NOI for the NCPA project.

5. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section III of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding the area of "Noise":

> Lake County general plan Noise element limits noise to 55 dba L_{dn} (Findings 1,4-7, and 9-11; Conclusions 2,4 and 6).
>
> Sonoma County land use permit (Findings 1,4-7, and 9-11; Conclusions 1-7).
>
> CAL-OSHA, 8 Cal. Admin. Code sections 5095-5099, and Cal. Vehicle Code section 23130 (Findings 2 and 4-11; Conclusions 1-7).
>
> Occupational Safety and Health Act of 1970 (Findings 3,4-7, and 9-11; Conclusions 1-7).
>
> USGS Geothermal Resources Operational Order #4 (Findings 3-7 and 9-11; Conclusions 1-7).

At the 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 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 applicable standards, ordinances, and laws.

FINDINGS AND CONCLUSIONS
WATER QUALITY

Findings

1. The Stretford effluent (solution, purge stream and sulfur) and steam condensate and condensate sludge 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 disposed of at an approved disposal site. The former will be temporarily stored at the site in an enclosed container, and either sold for use or disposed of at an approved disposal site.

3. The steam condensate will be utilized for cooling water and the excess will be reinjected.

4. The cooling tower emissions are likely to contain certain toxic chemicals. It is unlikely that these emissions would be deposited or otherwise reach surface waters in such quantities as to cause a violation of water quality standards.

5. The water quality standards which will be met include:

   a. U.S. Environmental Protection Agency, "Water Quality Criteria" (1972).

   b. U.S. Geological Survey, "Geothermal Resources Operational Order No. 4."

   c. California Water Quality Control Plan:

- Sacramento River Basin (5A)

- North Coastal Basin (1B)

d. Porter-Cologne Water Quality Control Act.

e. California Administrative Code, Title 23, Chapter 3.

f. California Regional Water Quality Control Board, North Coast Region, Order No. 74-151.

6. The Applicant has proposed to construct a retention barrier to surround the entire plant to contain any spills. The barrier will be impermeable and have a volume larger than any known spill and greater than the quantity of water above the plant site ground level. A catch basin with pump facilities and alarm devices will be constructed to pump any condensate spills back to the cooling tower. The area within the retention barrier shall be lined with a material of permeability of 1×10^{-6} cm/sec or less. Prior to or at the time of filing of the AFC, the Applicant shall submit the detailed design criteria for the retention barrier and liner.

7. The Applicant has suggested several methods for the disposal of the various wastes (sewerable, nonsewerable, and toxic) to be generated by the plant. The final selection of methods to be utilized depends upon an evaluation of several studies that were completed by January 5, 1979. Prior to or at the time of the filing of the AFC, the Applicant has agreed to provide the specific details of its proposal for disposal of all liquid wastes, including location and delineation of proposed facilities and their operational capabilities.

8. The Applicant has not demonstrated compliance with North Coast Regional Water Quality Control Board Order 74-151 ("Contingency Planning and Notification Requirements for Accidental Spills and Discharges"). Prior to or at the time of the filing of the AFC, the Applicant shall provide such information as will show compliance with the above order.

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. Prior to or at the time of the filing of the AFC, the Applicant shall submit the information requested in Findings 6, 7, and 8 above.

4. Staff and Applicant agree that no adjudication of this issue is necessary in the NOI.

6. Points of Clarification

Staff suggested, and Applicant concurred, with the changes in Findings 1 and 7 in order to more fully address the concerns raised in a comment from the State Department of Health (Appendix C; 12/21/78 Transcript, pp. 29-33; 1/22/79 Transcript, pp. 77-78).

Applicant stated that a reservoir analysis is still pending (12/22/78 Transcript, pp. 6-7; 1/22/79 Transcript, pp. 91-92).

7. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section IV of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding the area of "Water Quality":

> U.S. Environmental Protection Agency, "Water Quality Criteria" (1972) (Findings 4-8; Conclusions 1-3).
>
> U.S. Geological Survey,"Geothermal Resources Operational Order No. 4" (Findings 4-8; Conclusions 1-3).
>
> California Water Quality Control Plan
>
> - o Sacramento River Basin (5A)
> - o North Coastal Basin (1B)
>
> (Findings 4-8; Conclusions 1-3).
>
> Porter-Cologne Water Quality Control Act (Findings 4-8; Conclusions 1-3).
>
> California Administrative Code, Title 23, Chapter 3 (Findings 4-8; Conclusions 1-3).
>
> California Regional Water Quality Control Board, North Coast Region, Order No. 74-151 (Findings 5 and 8; Conclusion 3).

At the evidentiary hearing, the Applicant submitted written testimony and accompanying documents supporting its position that the proposed project would be unlikely to violate 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
SOILS

Findings

1. The soils series surrounding the plant site, when disturbed by earth moving activities, are highly erosive.

2. The standards applicable to the project regarding soils are:

   a. 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.

   b. Sonoma County Water Agency and Flood Control District Ordinances.

   c. U.S. Geological Survey, "Geothermal Resources Operational Order No. 4", paragraph 5.

3. The mitigation measures to be utilized for the project to control soil loss and erosion are as follows:

   a. The temporary and permanent measures outlined in the NOI at pages IX-1 through IX-3, 6-1.

   b. The proposals by the engineering consultants in "Specifications for the Preparation for Drill Sites and Access Roads" in the Castle Rock Springs EIR.

   c. 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.

d. The removal, stockpiling, and replacing of topsoil during grading operations.

4. While the mitigation measures proposed by the Applicant appear to be acceptable, no specific schedule or design for implementation has been designated. The Applicant shall provide, prior to or at the time of the filing of the AFC, the specific designs and schedules for the implementation of the measures outlined in Finding 3 above.

Conclusions

1. The Applicant shall implement the mitigation measures outlined in Finding Number 3.

2. If the mitigation measures in Finding Number 3 are implemented, it appears that this project will comply with the applicable standards.

3. The Applicant shall provide, prior to or at the time of the filing of the AFC, the information requested in Finding 4.

4. The Staff and Applicant agree that no adjudication of this issue is required in the NOI.

8. Point of Clarification

The Committee raised a question concerning a comment from the USGS regarding the need for certain information which was presented in the Castle

Rock Springs EIR (Appendix C). This information deals with more recent specifications for the preparation of drill sites and access roads. The Staff stated that the desired material will be provided in the EIR which will be prepared on the proposed project (1/22/79 Transcript, pp. 190- 91).

9. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section V 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 (Findings 1-4; Conclusions 1-3).
- Sonoma County Water Agency and Flood Control District Ordinances (Findings 1-4; Conclusions 1-3).
- USGS "Geothermal Resources Operational Order No. 4" paragraph 5 (Findings 1-4, Conclusions 1-3).

At the evidentiary hearing, the Applicant submitted written testimony and accompanying documents 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 substantial likelihood that the proposed project will comply with applicable soils standards. No one challenged the position of either party (1/22/79 Transcript, pp. 188-91).

While a final determination of compliance with the applicable Soils standards, ordinances, and laws 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
HYDROLOGY AND WATER RESOURCES

Findings

1. The Applicant proposes to utilize condensed geothermal steam for the plant cooling water supply.

2. The total plant operating needs for fresh inland waters will be minimal and should total approximately one acre foot of water per year.

3. The source for the necessary fresh water will be from either trucking water from existing water sources, utilization of the turbine building roof for collection of rain water, or drilling of a water well nearby. In any event, the impacts on water resources would be minimal.

4. The plant site is located on a ridge line and at the headwaters of Big Sulphur Creek. As such, there is little surrounding watershed upon which to generate overland flows and there would be no possibility of flood from Big Sulphur Creek.

Conclusions

1. The construction and operation of the proposed plant would not adversely affect fresh water resources.

2. The chances of the plant site being flooded by overland flow or from the nearest surface water (Big Sulphur Creek) are virtually nonexistent.

3. Staff and Applicant agree that no adjudication of this issue in the NOI or AFC is necessary.

10. Conformity with Applicable Standards, Ordinances, and Laws

No standards, ordinances, or laws applicable to the area of "Hydrology and Water Resources" have been identified. At the evidentiary hearing, both Applicant and Staff submitted written testimony and comments supporting the position that the proposed project will incur no flood danger and that there will be only minimal impact upon existing water resources (1/22/79 Transcript, pp. 191-93). No one has objected to this position. The Committee therefore accepts the joint position on this area.

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 standards 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.

   c. U.S. Geological Survey, Geothermal Resource Operational Order #4.

   d. BLM Cultural Resources Management Manual, March 6, 1978 (43 CFR Part 3 and Departmental Manual Part 310.7.6).

   e. Mineral Leasing Act of 1920 (P.L. 66-146; 41 Stat. 437).

3. The plant site, steam field, and transmission tie-line areas were evaluated for cultural resources by the Applicant in accordance with good pracice and no resources were found to be impacted by the proposed project.

Conclusions

1. The proposed plant and the related steam field will not impact upon cultural resources as none are present in the project area.

2. The proposed project will comply with the identified applicable standards set forth in Finding 2.

3. Applicant and Staff agree that no adjudication of these issues is required during the NOI process.

11. Point of Clarification

The Staff and Applicant submitted the above joint Findings and Conclusions at the evidentiary hearing, to serve in lieu of those contained at pages 48-9 of the Preliminary Report. The reason for the substitution is that the Applicant had submitted the previously requested information on December 26, 1978 (1/22/79 Transcript, p. 92).

Prepared testimony on behalf of the Applicant was submitted on January 29, 1979; the Staff submitted its original position paper and a supplement supporting the revised Findings and Conclusions at the evidentiary hearing (1/22/79 Transcript, pp. 193-7).

The Committee has modified the language of Finding 3 to clarify that the corridor for the proposed intertie from the plant site was evaluated for cultural resources concerns.

12. Conformity with Applicable Standards, Ordinances, and Laws

The applicable cultural resources standards are identified in Finding 2 above. Written testimony and documents submitted by the Staff and the Applicant at the evidentiary hearing indicate that the proposed project will comply with these standards and laws. The Committee is persuaded that conformity, for purposes of the NOI, has been adequately demonstrated.

FINDINGS AND CONCLUSIONS
SOCIO/ECONOMIC

Findings

1. The proposed project will employ approximately 85 workers during the power plant's peak construction time, and have an average employment level of 50 workers during its 33 month construction period.

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 impacts from the construction and operation of the NCPA power plant, irrespective of the origin of the workers. These impacts reflect the additional economic activity generated in the two Counties as a result of the payrolls of the personnel involved in the NCPA project. Sonoma County will most likely receive the greater amount of these payroll effects.

4. Sonoma County will receive tax revenues from the assessed value of the proposed power plant and a portion of the steam field.

5. Lake County will derive revenues from the development of that part of the NCPA steam field which lies within the County's boundaries.

6. The passage of Proposition 13 has altered the assessment picture for both the valuation of utility properties and local property tax rates.

7. Direct and indirect costs to be borne by Sonoma and Lake Counties, as well as by the communities near the project as a result of NCPA's construction and operation, will be minimal.

8. The proposed power plant is located in an area whose principal land use is the exploration, development, and utilization of geothermal energy, and which area has numerous geothermal power plants in operation.

9. Sonoma County has adopted a policy of providing for the planned development and restoration of an acceptable environment in such geothermal resource areas by means of: promoting the compatibility of the resource with the long range environmental, scenic, and open space potential of the development area; encouraging compatible, comprehensive multiple use of leaseholds; and applying high standards governing all phases of geothermal exploration and development.

10. The Commission Committee has requested Lake and Sonoma Counties to provide comments and recommendations regarding the compatibility of the proposed project with local land use plans, goals, and policies. No response has been received to date.

Conclusions

1. Due to the present resident labor force in the Sonoma-Lake County area, the proposed project will not cause a significant increase in the number of construction workers who may migrate to these areas in order to work at the NCPA power plant.

2. Payroll and income effects generated by the construction of the proposed power plant will occur in Sonoma and Lake Counties. Sonoma County, because of the large proportion of geothermal-related workers residing there, will likely receive the larger share of these income effects.

3. Direct and indirect costs for Sonoma and Lake Counties, as well as for the local communities near the project, as a result of NCPA's construction and operation of the power plant appear at this time to be less than the anticipated tax revenues associated with the project. Project tax revenue, as well as effects from construction payrolls, appears to be of sufficient magnitude to cause a positive balance in a cost-benefit comparison.

4. The proposed location of the facility is in an area that has numerous geothermal electrical generation facilities in operation. The proposal appears, therefore, to be compatible with the land use plans of Sonoma County.

5. Staff and Applicant agree that no adjudication of this issue will be necessary in either the NOI or AFC.

13. Point of Clarification

As referred to in Finding 10 above and mentioned on page 51 of the Preliminary Report, the Committee has again sought the comments of Sonoma and Lake County authorities regarding conformity of the proposed project with local and use plans. No responses have been forthcoming (see also 1/22/79 Transcript, p. 199).

14. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section IX of the Preliminary Report, the Committee identified the following as tentatively applicable to the proposed project regarding the area of "Socio/Economics":

Sonoma County General Plan
(Findings 8-10; Conclusion 4)

At the evidentiary hearing, the Applicant submitted written testimony and accompanying documents supporting its position that the proposed project is consistent with the general plans of Sonoma and Lake Counties. The Staff also stated its position and provided written testimony indicating that the proposed project will comply with applicable socio/economic standards. No one challenged the position of either party (1/22/79 Transcript, pp. 197-99).

The Committee is persuaded that, especially in light of the failure of Lake and Sonoma County authorities to comment or object despite repeated opportunities and requests to do so, the proposed project will comply with standards applicable to the area of socio/economics.

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 are relevant to making the public health, safety, and reliability determinations required by Public Resources Code Section 25511. For example, Findings 1-11 and Conclusions 1-8 on Noise, Findings 1 and 4-8 and Conclusions 1-2 on Water Quality, Findings 2-24 and Conclusions 3 and 8-10 and Conclusions 5-6 on Air Quality and emissions limitations, among others, speak to the adequacy of

public health and safety protection measures. Section IV.B also presents Public Health Findings and Conclusions. In addition, there are two other issues logically related to making safety and reliability determinations for geothermal power plants. These are the structural design and transmission line issues discussed in Section IV.C. Finally, the Committee has also set forth Findings and Conclusions dealing specifically with the issue of safety and reliability, 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 constitutents such as ammonia, arsenic, mercury, sulfur dioxide, suspended particulates, and radionuclides are also present. It became apparent during the proceedings on PG&E's Geysers Unit 17 (78-NOI-3) that additional detailed information was needed to meaningfully assess the public health affects of exposure to the components of geothermal steam. Air quality considerations also interact with this area but, as stated in the Air Quality section (section III.B), factors such as dilution,

dispersion, and ambient concentrations cannot be evaluated until the completion of the pending air quality analysis. The lack of relevant data thus renders the Findings and Conclusions regarding H_2S, ammonia, arsenic, mercury, and radionuclides, at this point, somewhat less definitive than desired though adequate for the purposes of this Report on the NOI. The data appears sufficient, however, to reach more definitive Findings and Conclusions regarding the public health effects of exhaust emissions of sulfates, sulfur dioxide (SO_2), and total suspended particulates (TSP).

2. Committee Findings and Conclusions

The Applicant and the Commission staff proposed joint Findings and Conclusions on the public health area. These appeared at pages 56-64 of the Preliminary Report.

No one has substantially challenged or objected to these Findings or Conclusions during the course of the NOI proceedings. Certain changes and amendments have, however, been suggested by the Staff, Applicant, and the NSCAPCO at the Preliminary Report and evidentiary hearings (12/21/78 Transcript, pp. 15-17; 1/22/79 Transcript pp. 80-83). The evidentiary offerings by the Staff and the Applicant during the course of the latter hearing are sufficient to persuade the committee that the Findings and Conclusions on Public Health, as amended, are well-founded (1/22/79 Transcript, pp. 199-202). The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

FINDINGS AND CONCLUSIONS
PUBLIC HEALTH

Findings - Hydrogen Sulfide

1. The NCPA power plant 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. Chronic long term exposure to H_2S concentrations of 0.08 ppm and above has been reported to cause adverse health effects in the human population.

3. The health effects of exposure to H_2S in concentrations less than 0.08 ppm are not well documented.

4. Due to the lack of data, and the uncertainty over the validity of studies of low level exposures, experts disagree on actual effects of such exposures.

5. Hydrogen sulfide has an odor which can be detected at concentrations less than 0.08 ppm.

6. The state ambient air quality standard for H_2S is 0.03 ppm (1 hour average).

7. The state ambient air quality standard for H_2S is based on a nuisance odor threshold.

8. The proposed Illinois ambient air quality standard for H_2S, which is intended to protect public health, is 0.01 ppm (8 hour average).

9. Ambient H_2S concentrations at receptors in the vicinity of Anderson Springs and at Anderson Ridge have exceeded the state standard of 0.03 ppm.

10. The impact of H_2S emissions from the NCPA power plant during normal power plant operation on ambient H_2S concentrations at receptors in the vicinity of The Geysers has not yet been adequately determined.

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

12. Applicant has proposed to conduct a study which will develop sufficient data for an analysis of the impacts of H_2S emissions from the NCPA power plant during normal power plant operation and from the steam release valve during periods of steam stacking on ambient H_2S concentrations in the vicinity of The Geysers.

13. The Applicant should monitor ambient H_2S concentrations in the vicinity of the NCPA power plant during the operating life of the power plant.

Conclusions

1. The health effects of continuous exposure to H_2S in concentrations less than 0.08 ppm are not known.

2. Due to insufficient data regarding adverse health effects from chronic exposure to H_2S at levels below 0.08 ppm, it cannot be concluded whether or not there will be adverse impacts to public health as a result of operation of this plant.

3. The Applicant shall ensure that ambient H_2S concentrations continue to be monitored in the vicinity of the NCPA power plant to determine the level of H_2S exposure experienced by the local population, including the Anderson Springs area. The Applicant shall include in an AFC submittal a proposal specifying the manner in which continued monitoring is to be effected.

Findings - Ammonia

1. NCPA Geothermal Project No. 2 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). The Environmental Protection Agency has, however, 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 has averaged 0.0194 percent by weight.

5. The NCPA cooling tower as proposed in the NOI will emit ammonia in concentrations less than 25 ppm.

6. Ammonia released to the atmosphere in the cooling tower exhaust and in the steam supply during steam stacking will be substantially diluted before reaching the nearest receptor.

7. Although dilution of ammonia emissions will occur during transport, the resultant ambient concentrations at points of sensitive receptors cannot be determined until the air quality analysis specified in the Air Quality portion of this Report is provided. At that time Staff will assess ambient ammonia concentrations either by: (a) applying a model which has been validated for H_2S transport; or (b) calculating ammonia dispersion patterns by extrapolating the results of tracer release studies.

8. Atmospheric reactions of ammonia emissions could potentially form toxic ammonium compounds, such as ammonium sulfate.

9. Sulfates can form through atmospheric oxidation of H_2S.

10. Sulfates can be toxic to humans when inhaled in sufficient quantities.

11. The California ambient air quality standard for suspended sulfates is 25 ug/m^3 (24 hour average).

12. 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 NCPA Geothermal Project No. 2.

13. 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. Although emissions of ammonia from the cooling tower and from the steam supply during periods of steam stacking are not expected to result in

ambient concentrations which could cause adverse public health impacts, a final conclusion must await the air quality analysis to be provided by Applicant.

2. Ammonium bisulfide formed by atmospheric reaction of ammonia emissions will not be present in sufficient quantities to cause adverse health effects.

3. 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 NCPA project.

Findings - Arsenic

1. NCPA Geothermal Project No. 2 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 concentration, and some forms are potentially carcinogenic.

3. 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. NIOSH suggests a standard of 2.0 ug/m^3 per 15 minute sampling for arsenic trioxide to protect against carcinogenic effects.

4. The U.S. Environmental Protection Agency has suggested 0.005 ug/m^3 as a safe level for arsenic concentrations in ambient air (EPA-600/7-77-136 a).

5. The maximum expected arsenic emissions from the cooling tower will be 1 ug/m^3 at point of exit. This arsenic concentration represents the maximum amount of arsenic in the incoming steam, and thus emissions during stacking would not exceed the amount emitted from the cooling tower.

6. 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.

7. Although dilution of arsenic emissions will occur during transport, the resultant ambient concentrations at points of sensitive receptors cannot be determined until the air quality analysis specified in the Air Quality portion of this Report is provided. At that time Staff will assess ambient arsenic concentrations either by: (a) applying a model which has been validated for H_2S transport; or (b) calculating arsenic dispersion patterns by extrapolating the results of tracer release studies.

Conclusion

1. Although emissions of arsenic from the cooling tower and from the steam supply during periods of steam stacking are not expected to result in ambient concentrations which could cause adverse public health impacts, a final conclusion must await the air quality analysis to be provided by Applicant.

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 the World Health Organization has suggested a standard of 0.8 ug/m^3 for all forms of mercury. In addition, the Environmental Protection Agency has suggested a maximum ambient level of 0.1 ug/m^3 to protect against toxicity and of 0.01 ug/m^3 to protect against potential carcinogenic effects (EPA-600/7-77-136 a).

4. The mercury content in the steam supply for the NCPA power plant may be as high as 0.02 ppm.

5. Maximum emission concentrations of mercury at the cooling tower point of exit will be approximately 1.0 ug/m^3. This mercury concentration represents the maximum amount of mercury in the incoming steam, and thus emissions during stacking would not exceed the quantity emitted from the cooling tower.

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 0.001 to 0.018 ug/m^3. The ambient concentrations were monitored while 11 geothermal power plants were operating. At least one additional power plant will be operating in the vicinity of the proposed site at the time the NCPA power plant is scheduled to commence operation.

8. Although dilution of mercury emissions will occur during transport, the resultant ambient concentrations at points of sensitive receptors cannot be determined until the air quality analysis specified in the Air Quality portion of this Report is provided. At that time Staff will assess ambient mercury concentrations either by: (a) applying a model which has been validated for H_2S transport; or (b) calculating mercury dispersion patterns by extrapolating the results of tracer release studies.

9. Mercury can enter the food chain from contaiminated 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 NCPA's emissions to the food chain as a result of normal power plant operation and from the steam release value during periods of steam stacking is not expected to be significant.

Conclusions

1. Although emissions of mercury from the cooling tower and from the steam supply during periods of steam stacking are not expected to result in ambient concentrations which could cause adverse public health impacts, a final conclusion must await the air quality analysis to be provided by Applicant.

2. The public health will not be adversely affected as result of the addition of mercury from the NCPA power plant to the food chain.

Findings - Radionuclides

1. The noncondensible gas fraction of geothermal steam originating from natural fumerols 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 NCPA power 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 are 100 pCi/l in air for a controlled area and 3pCi/l in air, above natural background, in an uncontrolled area.

8. NCPA should initiate a monitoring program to verify that concentrations of Radon 222 from plant operation remain below applicable standards.

9. The radionuclide ^{210}Pb will be contained in the cooling tower sludge from the NCPA power plant.

10. The ^{210}Pb will result from air scrubbing.

11. Cooling towers at power plant types other than geothermal power plants have shown the same tendency to scrub ^{210}Pb from ambient air.

12. If the cooling tower sludge is disposed of in a Class II-1 disposal site, the public will not be adversely affected by radionuclides in the sludge.

Conclusions

1. If ^{222}Rn content in the steam supply for the NCPA power plant is similar to that for PG&E Units 1-11, the resultant ambient concentrations from the NCPA power 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 detailed information on its proposed ^{222}Rn monitoring program at or prior to the filing of an AFC.

3. The Applicant shall dispose of the cooling tower sludge at a Class II-1 disposal site.

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 24 hour ambient air quality standard of 0.05 ppm 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 NCPA Geothermal Project No. 2 during normal power plant operation or during periods of steam stacking.

Conclusion

1. SO_2 resulting from operation of NCPA Geothermal Project No. 2 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. Emissions from NCPA Geothermal Project No. 2 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 normal operation.

4. 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.

5. The ambient air quality standard for TSP is intended to protect the public from adverse health impacts.

Conclusion

1. Emissions of TSP during normal power plant operation and during periods of steam stacking will not result in adverse public health impacts.

3. Points of Clarification

The following pollutants would not appear to subject the public to a health hazard in the concentrations which would result from operations of the proposed project: sulfates, mercury entering the food chain, radionuclides, sulfur dioxide (SO_2), and total suspended particulates (TSP). Assessment of the public health impacts of hydrogen sulfide (H_2S), ammonia, arsenic, and mercury in ambient concentrations must await the monitoring and other studies to be submitted by the Applicant.

It is the Committee's understanding that the monitoring information referred to in Findings 12 and 13 and Conclusion 3 of the Hydrogen Sulfide subsection will also be available for local APCD use concerning air quality considerations (see Section III.B.).

4. Conformity with Applicable Standards, Ordinances, and Laws

The Committee identified certain standards tentatively applicable to the area of "Public Health" in Appendix F, Section XI of the Preliminary Report. At the evidentiary hearing, the Applicant and the Staff submitted written testimony supporting their respective positions concerning compliance of the proposed project with applicable public health standards. These standards and the parties' positions regarding conformity with the standards are summarized below:

Standard, Ordinance, or Law*	Applicant Position	Staff Position
o California ambient air quality standards, 0.03 ppm (1 hr. average) Hydrogen Sulfide (Findings 6 and 7; Conclusions 1-3 on H_2S).	reasonable likelihood of compliance	compliance substantially likely
o ARB Rule 1609 Sulfates 25 ug/m^3 (24 hour average) (Findings 9-12; Conclusion 3 on ammonia).	will not exceed standards	will comply
o California Department of Health, 17 CAC Section 30355, Radon-222 (^{222}Rn) 100 pCi/1 in air for controlled area; 3 pCi/1 above natural background in uncontrolled area (Findings 1-12; Conclusions 1 and 3 in Radionuclides).	will not reach specified levels	reasonable likelihood of compliance
o ARB Rule 160, 0.05 ppm (24 hr. average); Surfur Dioxide; 0.5 ppm (1 hour average) (Findings 1-3; Conclusion 1 on SO_2)	will comply	will comply
o ARB Rule 160; Total Suspended Particulates (TSP) 60 ug/m^3 (Annual Geometric Mean); 100 ug/m^3 (24 hour average) (findings 2-5; Conclusion 1 on TSP).	will comply	will comply

No one objected to the positions summarized above.

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" and "New Source Review" Findings and Conclusions, the Committee is persuaded that a likelihood of compliance with applicable standards has, for the purposes of the NOI, been demonstrated.

*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 NCPA project will be assessed in light of various proposed recommended standards.

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 account for seismic and other potential hazards can logically be included among these factors, and "reliability" is logically related to the proposed transmission system for transporting power from the project to NCPA's members. These concerns are addressed under the subject headings of "Structural Design" and "Transmission Line" in the following Findings and Conclusions. In addition, the Committee has included separate Findings and Conclusions on the "Safety and Reliability" aspects of the proposed project.

2. Committee Findings and Conclusions

The Applicant and the Staff proposed joint Findings and Conclusions on the areas of "Structural Design" and "Transmission Line" which were included at pages 67-72 of the Preliminary Report. The parties also submitted proposed Joint Findings and Conclusions on the issue of "Safety and Reliability" at the evidentiary hearing.

No one has substantially challenged or objected to these Findings or Conclusions during the course of the NOI proceedings. The evidentiary offerings by the Staff and the Applicant during the course of the evidentiary hearing are sufficient to persuade the Committee that the proposed Findings and

Conclusions on these three areas are well-founded (1/22/79 Transcript, pp. 202-210). The Committee therefore adopts the following Findings and Conclusions for purposes of this Final Report:

FINDINGS AND CONCLUSIONS
STRUCTURAL DESIGN

Findings

1. The Applicant proposes to utilize the applicable provisions of the Uniform Building Code, 1976 edition (UBC), as well as the American Institute of Steel Construction (AISC) and American Concrete Institute (ACI) specifications for its structural design, other than for seismic considerations. For the purposes of the NOI, the Applicant's agreement to use these structural codes is sufficient. However, the application of these various codes to specific structural elements will be reviewed during the AFC.

2. The Applicant proposes to utilize the "Static STRUDL" program for the structural analysis of its major structures. The STRUDL program, containing many analysis methods including both static and dynamic capabilities, is a general analysis program for structural design. For the purposes of this NOI, the use of the STRUDL program is acceptable. However, the application of the various program options to specific structural elements will be reviewed during the AFC.

3. To determine seismic performance criteria, or acceptable seismic risk, the Applicant proposes to do the following:

"The consulting geologist and soils engineer will investigate the following:

a. Establish a range of possible earthquakes that could be used in the design of the structures.

b. Analysis of the responses of the site during the postulated design earthquake to evaluate maximum site acceleration and the associated response spectra for various spectral damping ratios.

c. Establish representative design spectra for each of the postulated design earthquakes.

The probability of the various earthquakes will be evaluated by the geologist and the structural engineer and will be submitted to the jurisdictional agencies for comments. This will establish seismic risk criteria for the specific building site and facility. The criteria will include safety and operational capacity information."

4. Prior to or at the time of the filing of the AFC, the Applicant shall have completed the tasks outlined in Finding #3 above including review by CEC and USGS (jurisdictional agencies) and shall submit, in the form of a report, the conclusions reached as a result of the activities undertaken in Finding #3 above. The report shall include data, methodology, calculations, and assumptions used to derive the conclusions.

5. To determine seismic design criteria, the Applicant proposes to do the following:

"Following evaluation and selection of a design earthquake, the structural engineer will determine the (sic) time period of the specific structures to be designed. He will also select a damping ratio and will use the appropriate spectral acceleration value as provided in the design acceleration spectra. The (sic) time period of the specific structure will be obtained by computer analysis. The structural analysis itself will be performed using the STRUDL program. If necessary, the structural engineer may elect to use a dynamic analysis. For equipment supports and tie downs, acceleration values, both horizontal and vertical, will also be selected by the structural engineer and used in his design."

6. Prior to or at the time of the AFC filing the Applicant shall have completed the study described in Finding #5 above and shall submit in the form of a report the work undertaken in Finding #5 above. The report shall include the data assumptions, methodology, and calculations used to derive the conclusions.

7. To determine seismic response of the site, structures, and the seismic environment of major equipment, the Applicant proposes to do the following:

"Seismic design criteria for the proposed structures would be developed through the use of SHAKE, TRAVEL, and/or FLUSH computer programs developed by the University of California, Berkeley. University personnel instrumental in the development of these programs would be consulted on their application. Based on a review of historic seismic data, several regional faults would be selected for study. Synthetic or existing earthquake records for those faults would be used to compute ground response and structural response spectra for both maximum probable and maximum credible earthquakes. The resulting data would be presented in the form of structural response spectra."

8. Prior to or at the time of the filing of the AFC, the Applicant shall have completed the tasks outlined in Finding Number 7 above and shall submit, in the form of a report, the conclusions reached as a result of the work undertaken in response to Finding Number 7. The report shall include the data, methodology, calculations, and assumptions used to derive the conclusions.

Conclusions

1. The Applicant shall provide the information specified in Findings Nos. 4, 6, and 8 at or prior to the filing of the AFC for the NCPA Geothermal Project No. 2.

2. Subject to the receipt of additional data, the NCPA proposal regarding structural engineering and design is acceptable for an NOI.

3. The Findings and Conclusions presented herein relate only to general design concepts. The results of the application of these concepts cannot and should not be determined until the AFC. At that time, the methodology, results, and data will be scrutinized to ensure that the intent of the seismic performance criteria is achieved.

4. Staff and Applicant agree that no adjudication of this issue will be necessary in the NOI.

3. Points of Clarification

The following were provided in response to a Committee request for an explanation of "sic" appearing in Finding Number 5.

The Staff response of November 15, 1978 indicates, in part:

> " 'Sic' was inserted as the term 'time period' which follows is not a technically correct term. The correct term should be 'fundamental period', or inversely stated, 'fundamental frequency'".

In its response of November 10, 1978, the Applicant stated:

> "...'time period' [was intended] to generically refer to the natural period of a structure."

4. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section VII of the Preliminary Report, the Committee identified the Uniform Building Code* (1976 ed.; Findings 1-8; Conclusions 1-3) as tentatively applicable to the "Structural Design" area of the proposed project.

The Applicant and the Staff have submitted written testimony and statements of position sufficient to indicate that the foregoing Findings and Conclusions adequately deal with structural design consideration for the purposes of the NOI (1/22/79 Transcript, pp. 202-05). No one has challenged the parties' position.

*The Applicant has also agreed to comply with the applicable provisions of the American Institute of Steel Construction and the American Concrete Institute. While these are professional guidelines and specifications, they are not "applicable local, regional, state, and federal standards, ordinances, and laws" for which compliance is required pursuant to Public Resources Code section 25512. Accordingly, these professional specifications are not set forth in the body of this Report. It also should be noted that the application of these specifications will be reviewed during the AFC.

The Committee is aware, however, that final determination of compliance with structural design standards cannot and should not be made until the AFC proceeding. This is consistent with the positions of both Staff and Applicant. Therefore, the Committee concludes that an intent to comply with structural design standards, sufficient for purposes of the NOI proceeding, is apparent.

FINDINGS AND CONCLUSIONS
TRANSMISSION LINE

Findings

1. The Applicant proposes to construct a 2.1 mile unbundled double circuit, 1113 KCM conductor transmission line from the plant site to PG&E's existing 230 KV transmission line. Only one circuit will be installed initially. The additional circuit will be added when generation capacity is increased.

2. PG&E and the Applicant are presently negotiating a transmission service agreement whereby PG&E will provide firm transmission service (wheeling) to the Applicant. The exact terms and conditions of the agreement have not yet been agreed upon. The Applicant shall file a copy of the transmission service agreement with the Committee as soon as it is finalized. If the agreement is not finalized and filed prior to the filing of the AFC, the Applicant shall file a status report regarding the transmission service agreement with the Committee at the time of the filing of the AFC, which shall specify the provisions upon which agreement has been reached and those which remain unresolved.

3. The Applicant is also studying additional methods of transmitting from the Geyers the power from its Geothermal Unit No. 2 rather than via PG&E's system. The Applicant has agreed to submit a copy of its study when it is completed. The study shall be filed prior to or at the time of the filing of the AFC.

4. Upon the receipt of the transmission study referred to in Finding 3 above and/or Transmission Service Agreement referred to in Finding 2 above, the

Staff shall report to the Committee regarding power transmission alternatives at the Geysers.

5. The Applicant has agreed to comply with Public Utilities Commission General Order 95.

Conclusions

1. The Applicant shall provide the information requested in Findings Nos. 2 and 3 prior to or at the time of the filing of the AFC.

2. The Staff and Applicant agree that no adjudication of this issue during the NOI is necessary.

5. Points of Clarification

The "transmission line" referred to in these Findings and Conclusions includes both the tap line (intertie) from the proposed project and the method for getting power out of the Geysers area. In this context, the latter is discussed with respect to the wheeling agreement/negotiations with PG&E and the likelihood of NCPA being able to arrange for transmission of its power from the proposed project; it does not refer, at this point, to a particular transmission line (1/22/79 Transcript, p. 207).

The Applicant is currently studying alternative means of transmitting its power out of the Geysers. It is anticipated that the results of this study will be completed prior to or at the fiing of an AFC (12/21/78 Transcript, p. 48; 1/22/79 Transcript, p. 95). Wheeling negotiations, noted in the Preliminary Report as having an anticipated completion time of January 1979, are apparently still in progress (1/22/79 Transcript, p. 95).

The "generation capacity" referred to in Finding Number 1 above refers to reasonably anticipated, though not definitive, future field developments in the general geographic area of the proposed project. The proposed tie-line would be capable of accomodating a total of approximately 320 MW under a single contingency condition, i.e., one of the two circuits out of service. The figure of 320 MW differs from that on page 72 of the Preliminary Report, but Staff and Applicant have indicated at the evidentiary hearing that the higher figure is indeed correct (1/22/79 Transcript, p. 84).

6. Conformity with Applicable Standards, Ordinances, and Laws

In Appendix F, Section VIII of the Preliminary Report, the Committee identified Public Utilities Commission General Order No. 95 (Findings 1-5; Conclusion 1) as tentatively applying to the "transmission line" area of the proposed project.

At the evidentiary hearing, the Applicant submitted written testimony and accompanying documents supporting its position that the proposed project would comply with the applicable standards. The Staff also stated its position and provided written testimony indicating that while additional information is needed, there is a substantial likelihood that the proposed project will comply with applicable transmission line standards. No one challenged the position of either party (1/22/79 Transcript, pp. 205-207).

While a final determination of compliance with the applicable transmission line standards cannot be made until the additional information referred to in the Findings and Conclusions is submitted in the AFC, the Committee concludes that the evidence is sufficient to demonstrate reasonable likelihood of compliance with such standards for purposes of the NOI.

FINDINGS AND CONCLUSIONS
SAFETY AND RELIABILITY

Findings

1. The Applicant proposes twin 55 Mw turbine generator units with total redundancy on all auxiliaries except for one instrument air compressor which will be a common spare. Even though this is NCPA's first power plant, the projected high availability and capacity factors appear to be reasonable, in light of the proposed design. Therefore, reliability is not considered to be an issue in this NOI.

2. The Applicant proposes to store small quantities of toxic and hazardous materials onsite for use in plant operations. In light of the Applicant's proposed handling and storage procedures, adverse health and safety effects from the stored materials to plant personnel and the general public would be avoided.

3. On pages 9-3 to 9-7 of Volume 2 of the NOI, the Applicant provided a description of its proposed emergency instrumentation and control systems for various individual items of equipment as well as a description of the upset conditions requiring the use of the emergency systems.

4. The description of the emergency instrumentation and control systems was adequate for the purpose of the NOI.

5. The Applicant has not, however, provided either a description of the procedures to be followed by a control operator to determine the appropriate response to an emergency or upset condition at the facility, or a discussion 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.

Conclusions

1. The Applicant shall provide the information specified in Finding 5.

2. Subject to further evaluation during the AFC, the proposed plant is reasonable from a reliability and safety viewpoint.

3. Staff and Applicant agree that no adjudication of this issue is necessary during the NOI.

7. Point of Clarification.

The Staff and Applicant initially proposed a joint "reliability" Finding at the hearing on the Preliminary Report (12/21/78 Transcript, pp. 52-3). This single Finding was, however, replaced at the evidentiary hearing by the jointly submitted Findings and Conclusions concerning the issue of "safety and reliability" (1/22/79 Transcript, pp. 83; 208-10).

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

There are no specific standards which apply to the broad area of "safety and reliability". The Staff submitted written testimony at the evidentiary hearing supporting the above Findings and Conclusions (1/22/79 Transcript, pp. 208-10), and the Applicant submitted similar written testimony on January 25, 1979. In view of the above, and in view of the Findings and Conclusions on other subject areas related to safety and reliability, the Committee is satisfied that the "Safety and Reliability" Findings and Conclusions above are adequate for purposes of the NOI.

V. ISSUES REQUIRING FURTHER REVIEW

A. Introduction

The first basis for identifying issues that may require further consideration in proceedings on NCPA's proposal to construct and operate its Geothermal Project No. 2 lies in the Findings and Conclusions presented in the foregoing sections. Several of these Findings and Conclusions reference information, studies, or reports that NCPA has agreed to provide prior to or at the time of filing the Application for Certification, should the Commission approve the Notice of Intention. The questions to which this additional information relates remain unanswered. The second source of issues that require further consideration is the statements made by various participants and the discussions that have ensued during the proceedings to date on the Notice, as described in Section I.C.

The preceedng Findings and Conclusions indicate that the areas of "Hydrology and Water Resources" and "Socio-Economics" would require no adjudication at the AFC stage. Additional information is to be submitted on the subjects of "Demand Forecast Compliance", "Water Quality", "Soils", "Structural Design", "Transmission Line", "Public Health", "Air Quality", "Air Quality New Souce Review", and "Safety and Reliability". The following subsection sets forth 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 NCPA Notice and a brief description of the information which the Committee expects to receive concerning each question during the second stage of the siting process. The information required to resolve outstanding questions is not expected to be available until the time NCPA files an AFC for its Geothermal Project No. 2, should the full Commission approve the Notice.

Under these circumstances, and including new 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. NCPA, the various participants to the proceeding, and the public are invited to state their views during the hearing on the Final Report as to whether or not the NOI for the NCPA Geothermal Project No. 2 should be approved, and as to whether the Proposed Decision contained in Appendix E 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.

Area	Information and Tasks*
Demand Forecast Compliance	Evaluation of proposed financing arrangements and relative costs to determine merit of purchase power vs. self-generated power. (Finding 9).
Water Quality	Detailed design criteria for retention barrier and liner; specific details of proposal for disposal of all liquid wastes; showing of compliance with North Coast Regional Water Quality Control Board Order 74-151 ("Contingency Planning and Notification Requirements for Accidental Spills and Discharges"). (Findings 6, 7, 8; Conclusion 3).
Soils	Specific measures, designs, and schedules to mitigate soil loss and erosion. (Finding 4; Conclusion 3).

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

Area	Information and Tasks*
Structural Design	Establish range of possible earthquakes for design purposes; analysis of site responses during postulated design earthquake to evaluate maximum site acceleration and associated response spectra for various spectral damping ratios; establish representative design spectra for each postulated design earthquake; submit seismic risk criteria to jurisdictional agencies and a report of conclusions reached; detailed structural analysis; reports to include data assumptions, methodology, and calculations used to derive conclusions. (Findings 4, 5, 6, 8; Conclusion 1).
Transmission Line	A copy of the transmission service (wheeling) agreement or, if no agreement has been reached, a status report on the negotiations; study regarding additional methods of transmitting power from proposed project. (Findings 2, 3, 4; Conclusion 1).
Public Health	Study to develop data sufficient to analyze impacts of H_2S emissions from proposed project during normal power plant operation and from steam release valve during periods of steam stacking on ambient H_2S concentrations in the Geysers vicinity; detailed information on ^{222}Rn monitoring program; air quality study would assist in resolving concerns for ammonia, arsenic, and mercury. (Finding 12; Conclusions 2, 3; "Ammonia", Finding 7, Conclusion 1; "Arsenic", Finding 7, Conclusion 1; "Mercury", Finding 8, Conclusion 2).

Area	Information and Tasks*
Air Quality	Operating data from PG&E Unit 15 to determine partitioning efficiency of surface condenser or specific proposals for condensate treatment systems, if necessary; information demonstrating the ability of the automated flow control valve to regulate the amount of steam released at the steam release valve to reduce H_2S stacking emissions in compliance with local APCD rules. (Findings 13, 14, 15; Finding 7, Conclusions 1, 4).
Air Quality New Source Review	Detailed air quality analysis considering maximum impact at points of sensitive receptors, assessing impacts of normal plant operation and of steam stacking during shutdown; if analysis shows violation of H_2S standard at sensitive receptors, then perform a similar analysis under conditions specified in Findings and Conclusions, under specified meteorological conditions. (Findings 12-16; Conclusions 3-4).
Safety and Reliability	A description of the procedures to be followed by a control operator to determine the appropriate response to an emergency or upset condition; a discussion of the basis for a decision by the operator to shut the plant down. (Finding 5; Conclusion 1).

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 NCPA Geothermal Project No 2. Final action

will of course occur at the conclusion of the AFC proceeding. This next subsection therefore discusses principal areas of concern remaining for purposes of the AFC proceedings that information yet to be submitted by the Applicant or other participants is intended to resolve.

1. Air Quality

NCPA is proposing to use a surface condenser and Stretford H_2S abatement system to enable the Geothermal Project No. 2 power plant to meet applicable H_2S emissions limitations. The Applicant proposes to use automated flow control valves to control emissions from the steam release valve during periods of steam stacking. There are two major questions regarding the area of air quality: 1) will the proposed NCPA project, during normal operations and in periods of steam stacking, comply with applicable H_2S emissions limtations? and 2) will the proposed project, during normal operations and in periods of steam stacking, prevent the attainment, interfere with the maintenance, or cause a violation of the H_2S ambient air quality standards?

Several general questions regarding the applicability of various regulations, such as federal PSD standards, presently remain unanswered. These broad issues will require, among other things, further authoritative interpretation by the proper jurisdictional entities, even in light of the conferences on PSD review now in progress and the joint CEC-ARB agreement.* There are, however, certain somewhat narrower issues which the Committee believes must be addressed in the AFC and concerning which the Applicant has agreed to submit clarifying information.

*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 H_2S emissions from geothermal power plants.

a. 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 ("Air Quality", Findings 6-10).

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 one is not yet in use at a geothermal power plant. 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. It was thought earlier that this data would be available at the time NCPA files an AFC for the proposed project ("Air Quality", Findings 11-13; Conclusion 1), but it now appears that the data will be delayed. This data will also bear on the timing and installation of a condensate treatment system which may be required concurrently with the construction of the NCPA power plant if the partitioning efficiency is less than 75-85 percent, or prior to January 1, 1985, in order to meet more stringent emissions limitations scheduled to take effect at that time. (Id., Findings 14-15). If, in fact, partitioning data from Geysers Unit 15 is not available at the time NCPA files its AFC, then the Applicant will provide information on the alternative or additional treatment systems or techniques it will use should partitioning data from Unit 15 ultimately indicate inadequate partitioning efficiency to enable H_2S emissions limitations and ambient air quality standards to be met.*

*"Air Quality" Findings 14, 15.

b. NSCAPCD Rule 455(b) requires specified reductions of H_2S emissions during periods of steam stacking. Shell Oil Company, the steam supplier, proposes to comply with these H_2S stacking emissions limitations through the use of automated flow control valves, but has not yet demonstrated that such devices would actually result in compliance ("Emissions Limitations - Steam Stacking," Findings 3-6, Conclusion 5).

Question: Will the steam supplier be able to comply with the H_2S stacking emissions limitations through the use of automated flow control valves?

Information Required: At or prior to the time an AFC is filed, the Applicant will obtain and provide detailed information demonstrating the engineering feasibility of the automated flow control valve to reduce H_2S emissions in conformity with Rule 455(b) (Id., Finding 7; Conclusion 4).

c. Air Quality New Source Review

Question: Will the proposed NCPA Geothermal Project No. 2 prevent the attainment, interfere with the maintenance, or cause a violation of the H_2S ambient air quality standard during normal power plant operations and during periods of steam stacking?

Information Required: The air quality analysis provided in the NOI is inadequate to determine the above mentioned effects of the H_2S emissions ("Air Quality New Source Review", Finding 11). The Applicant has agreed to perform an additional air quality analysis to deal with specified concerns, and under specified conditions, to gather information sufficient to permit an informed evaluation of New Source Review issues (Id., Findings 12-15; Conclusion 3). The

Applicant shall also conduct an air quality and meteorological study to provide data sufficient to adequately perform the specified air quality analysis; (Id., Finding 15; Conclusion 4).

2. Biological Resources

a. Question: How would the Applicant reduce the on-site impact of the power plant to biological resources?

Information Required: The Applicant has submitted, on February 5, 1979, a mitigation plan specifying proposed mitigation measures. The nature and significance of a water seep located in the southeastern portion of the plant site and believed to be an area of critical concern was covered in a study submitted by the Applicant on December 15, 1978. Commission staff will evaluate this study and identify appropriate mitigation measures for consideration in the AFC. ("Biological Resources," Findings 10, 12; Conclusion 1).

b. Question: What are the effects of cooling tower drift on vegetation in the area?

Information Required: Data on the effects of cooling tower drift on vegetation in the vicinity were supplied by the Applicant on December 15, 1979. The Staff will review this information and make appropriate recommendations to the Committee (Id., Finding 13; Conclusion 1), in the context of the AFC proceeding.

3. Water Quality

a. Question: What type, size, etc. retention barrier will be required to contain potential spills from the power plant site?

Information Required: The Applicant has proposed to construct an impermeable barrier around the entire plant which will have a volume larger than any known

spill and greater than the quantity of water contained above the plant site ground level. Prior to or at the time of filing the AFC, NCPA will submit the detailed design criteria for the barrier and liner for the area within the retention barrier ("Water Quality," Finding 6; Conclusion 3).

b. Question: What method will be used for disposal of various sewerable and non-sewerable liquid wastes generated by the plant?

Information Required: The final selection of disposal methods depends upon the completion of several ongoing studies. Prior to or at the time of filing the AFC, the Applicant will submit the specific details of its proposal for disposal of all liquid wastes, including location and delineation of proposed facilities and their operational capabilities ("Water Quality", Finding 7; Conclusion 3).

c. Question: Is the project in compliance with the North Coast Regional Water Quality Control Board Order 74-151 ("Contingency Planning and Notification Requirements for Accidental Spills and Discharges")?

Information Required: Prior to or at the time of filing the AFC, the Applicant shall provide such information as is necessary to show compliance with the above order ("Water Quality," Finding 8; Conclusion 3).

4. Soils

a. Question: What specific designs and schedules for the implementation of soil loss and erosion mitigation plans does the Applicant propose to utilize?

Information Required: Prior to or at the time of filing the AFC, the Applicant shall provide specific designs and schedules for implementation of soil loss and erosion control measures ("Soils," Finding 4; Conclusion 3).

5. Public Health

a. Question: Will H_2S emissions from the proposed plant result in adverse public health impacts?

Information Required: The health effects of continuous exposure to H_2S in concentrations less than 0.08 ppm are not known, and it therefore cannot be concluded at present whether plant operations would adversely affect public health ("Public Health," Findings 2-4, 10; Conclusions 1-2). The Applicant has agreed to conduct a study that will develop sufficient data for an analysis of the impacts of H_2S from the proposed project and shall include a proposal in the AFC specifying the manner in which ambient H_2S concentrations will continue to be monitored in the vicinity of the proposed project (Id., Findings 12-13, Conclusion 3).

b. Question: Would ammonia, arsenic, mercury, or radionuclide emissions during operations of the proposed project pose public health hazards?

Information Required: A final determination regarding potential hazards posed by ammonia, arsenic, and mercury emissions must await the air quality analysis referred to in Sections V.1.a. and c. ("Ammonia," Finding 7, Conclusion 1; "Arsenic," Finding 7, Conclusion 1; "Mercury," Finding 8, Conclusion 1). A monitoring program would be initiated by NCPA to verify that concentrations of radon-222 from plant operations remain below applicable standards ("Radionuclides," Finding 8; Conclusion 2).

6. Structural Design

a. Question: How will seismic performance criteria or acceptable seismic risk be determined?

Information Required: Prior to or at the time the AFC is filed, the Applicant's consulting geologist and soils engineer will investigate, analyze, and establish appropriate possible earthquake ranges, site responses during the postulated design earthquake, and representative design spectra. In addition, the results of the study shall be submitted to the Commssion and the U. S. Geological Survey for review and, prior to filing the AFC, the Applicant shall submit, in the form of a report, the conclusions reached ("Structural Design," Findings 3-4; Conclusion 1).

b. Question: How will seismic design criteria be determined?

Information Required: The Applicant will submit a detailed report dealing with the fundamental period of the structures to be designed. Both horizontal and vertical acceleration values will be selected and used for equipment supports and tie downs. The Applicant will submit this report at or prior to the filing of the AFC ("Structural Design," Findings 5-6; Conclusion 1).

c. Question: How will the seismic response of the site, structures, and seismic environment of major equipment be determined?

Information Required: Prior to or at the time of filing the AFC, the Applicant shall submit a report containing the conclusions reached on seismic design criteria developed in part through the use of SHAKE, TRAVEL, and/or FLUSH computer programs. Several regional faults would be selected for study, and

synthetic or existing earthquake records would be used to compute ground response and structural response spectra for both maximum probable and maximum credible earthquakes ("Structural Design," Findings 7-8; Conclusion 1).

7. Transmission Line

a. Question: What is the status of the proposed transmission service (wheeling) agreement between NCPA and PG&E?

Information Required: The exact terms of this agreement have not yet been reached. The Applicant shall file a copy as soon as it is finalized. If not finalized prior to the AFC filing, the Applicant shall then file a status report with the AFC specifying the resolved and unresolved areas ("Transmission Line," Finding 2; Conclusion 1).

b. Question: What are the alternative means of transmitting power from the proposed project to NCPA's members?

Information Required: Prior to or at the time the AFC is filed, NCPA shall submit a study regarding additional methods of transmitting power from its proposed project. The Staff shall also report regarding power transmission alternatives at the Geysers ("Transmission Line," Findings 3-4; Conclusion 1).

8. Safety and Reliability

a. Question: What procedures would the control operator follow in responding to an emergency or other upset condition at the proposed facility, and what basis would such operator use in deciding to shut the plant down?

Information Required: At or prior to the AFC filing, NCPA will submit information concerning emergency response procedures and shut down criteria to be

followed by a control operator ("Safety and Reliability", Finding 5; Conclusion 1).

APPENDIX A

Timeline of Events

APPENDIX A

TIMELINE OF EVENTS

NOI filed	August 11, 1978
Executive Director Accepted NOI	August 22, 1978
Commission Committee Appointed	September 6, 1978
Issue Workshops	September 21, 22, 26, 1978
Procedural Conference	September 26, 1978
Informational Hearings, Santa Rosa and Kelseyville, CA	October 10, 1978
Joint Prehearing Conference Statement Workshops	October 16, 17, 1978
Prehearing Conference	October 31, 1978
Prehearing Conference Order	November 16, 1978
Preliminary Report	December 6, 1978
Public Hearing on Preliminary Report	December 21, 1978
Written Comments on Preliminary Report	Until January 5, 1979
Notice of Evidentiary Hearing and Hearing Order	December 22, 1978 and January 12, 1979
Evidentiary Hearing	January 22, 1979
Close of evidentiary hearing record	January 31, 1979
Final Report	March 2, 1979
Committee Conference on Final Report	March 12, 1979
Hearing on Final Report and Proposed Decision on NOI before full Commission	March 14, 1979

APPENDIX B

Proof of Service List

APPENDIX B

STATE OF CALIFORNIA

State Energy Resources
Conservation and Development Commission

In the Matter of:)
)
Notice of Intention to File) DOCKET NO. 78-NOI-5
An Application for Certification)
for 110 MW Geothermal Power)
Plant, NCPA Geothermal)
Project #2. (NCPA/Shell Project))

APPLICANT

Northern California Power Agency
Bill Daniels
SAI Engineers
3200 Scott Boulevard
Santa Clara, CA 95050

Mr. Norman Ingraham
Executive Director
Northern California Power Agency
770 Kiely Blvd.
Santa Clara, CA 95051

Shell Oil Company
Steve McVeigh
1200 Milam Street
P.O. Box 831
Houston, TX 77001

Mr. Martin McDonough
General Counsel
555 Capitol Mall
Sacramento, CA 95814

REPORTER

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

FEDERAL PARTICIPANTS

United States Geological Survey
ATTN: Mr. Wright Sheldon
345 Middlefield Road
Menlo Park, CA 94025

United States Geological Survey
Office of Area Geothermal Supervisor
ATTN: Leroy Mohorich
2465 East Bayshore Road, Suite 400
Palo Alto, CA 94303

Mr. Joel Verner
Bureau of Land Management
P.O. Box 940
555 Leslie Street
Ukiah, CA 95482

Mr. Raymond A. Brechbill
Department of Energy
1333 Broadway
Oakland, CA

CALIFORNIA ENERGY COMMISSION

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

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

Docket Section (12)
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Sacramento, CA 95825

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Pam Patterson
Secretary of the Commission
State of California Energy
Resources Conservation and
Development Commission
1111 Howe Avenue
Sacramento, CA 95825

David F. Meith
Office of Projects Administration
California Energy Commission
1111 Howe Avenue
Sacramento, CA 95825

APPENDIX C

Public Agency Comments

The following are written comments from public agencies submitted between the date of the publication of the Preliminary Report and the preparation of the Final Report.

APPENDIX C

List of Public Agency Comments

Date	Agency
December 7, 1978	State Department of Health Services, Hazardous Materials Section (docketed in several geothermal proceedings) - Harvey Collins, Acting Chief
December 18, 1978	Northern Sonoma County Air Pollution Control District (docketed in several geothermal proceedings) - Michael W. Tolmasoff, NSCAPCO
December 19, 1978	State Air Resources Board (docketed originally as Comments on Final Report of PG&E Unit 17, 78-NOI-3, but also entered into administrative record of present proceeding.) - Kathleen Kahn, Staff Counsel
December 20, 1978	State Air Resources Board - Harmon Wong-Woo, Chief, Stationary Source Control Division
January 4, 1979	United States Geological Survey - Barry A. Boudreaux, Acting Area Geothermal Supervisor
January 12, 1979	Northern Sonoma County Air Pollution Control District - Michael W. Tolmasoff, NSCAPCO
January 12, 1979	Northern Sonoma County Air Pollution Control District - Michael W. Tolmasoff, NSCAPCO
January 12, 1979	State Department of Fish and Game - E.C. Fullerton, Director

State of California

Department of Health Services

Memorandum

43

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

Date : December 7, 1973

Subject: Wastes from proposed Geothermal Power Plants

Telephone: ATSS ( ) 2-2337
( )

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

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

1. The cooling tower condensate sludge;

2. The Stretford solution purge stream produced by the hydrogen sulfide (H_2S) abatement systems;

3. The non-saleable sulfur cake produced by the H_2S abatement system; and

4. The saleable sulfur cake produced by the H_2S abatement system.

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

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

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

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

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

Harvey P. Collins

Harvey P. Collins, Ph.D.
Acting Chief

Attachments (2)
See attached page for cc's

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT
141 NORTH STREET, HEALDSBURG, CA. 95448
(707) 433-5911 OR (707) 433-5742

PA Comments

78-NOI-3

December 18, 1978

78-NOI-6
78-NOI-7

ENERGY COMMISSION RECEIVED
DEC 22 1978

RECEIVED
DEC 20 1978

State of California
Energy Commission
1111 Howe St., M.S. #15
Sacramento, Ca., 95825

ATTENTION: COMMISSIONER SUSANNE REED

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

Dear Miss Reed:

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

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

(1) BACT should mean the ability to achieve 8gm/GMW-Hour or 99% level of abatement.

(2) Each project air analysis should consider drainage conditions, limited vertical mixing and downwash conditions. If a study is warranted, then it should have District approval for overall design objectives.

(3) Effectiveness of Stretford scheme and "partitioning of non-condensables" is not important as long as secondary H_2O_2 abatement is available.

(4) Utilities should consider dual units until a satisfactory control system is found for steam transmission line stackings.

(5) The Utility must improve its operational procedures toward shut down warning devices, curtailment rather than shut down and level of manpower to prevent extended shut downs.

(6) The steam transmission line is within the jurisdiction of the APCD unless the utility becomes responsible for "stacking" during shut down.

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

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

Sincerely,

Michael W Tolmasoff

MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MWT/ak

cc: Steve Zalusky, Lake County Air Pollution District

161

KINGSLEY MACOMBER
STEVEN D. BURTON
KATHLEEN KAHN
LESLIE KRINSK
Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Telephone: (916) 322-2884

Attorneys for Intervenor
Air Resources Board

RECEIVED
DEC 21 1978
HEARING OR

BEFORE THE CALIFORNIA ENERGY COMMISSION
STATE OF CALIFORNIA

In the Matter of: Notice of Intention of PACIFIC GAS AND ELECTRIC COMPANY to File an Application for Certification Regarding Geysers Unit 17	DOCKET NO. 78-NOI-3 COMMENTS ON FINAL REPORT

The Air Resources Board recommends adoption of the Proposed Decision contained in the Final Report. The Board in addition endorses the analysis contained in Part V.B.1. concerning unresolved air quality issues and the information which will be needed to resolve them. The only comments which we wish to offer on the Final Report concern the discussion of air quality issues which begins at page 19. That discussion indicates that the Board has taken the position that NSCAPCD Rule 455 - the H_2S control strategy - preempts the BACT and trade-off provisions of the new source review rule, NSCAPCD Rule 230. The discussion also indicates an apparent conflict between the Board and the NSCAPCD on this issue, since the District does not believe that the emissions limitation for new sources contained in the control strategy constitutes BACT. We believe this conflict is more apparent than real. We concur with the view that application of a BACT requirement would involve much more stringent emission controls than are required by the control strategy. Furthermore, the Board did not intend,

by its memorandum of August 1 or any other statement, to assert a position that the District is in any way barred from requiring BACT on a new geothermal source. Our comments, then, are offered to explain the relationship between a "control strategy" such as NSCAPCD Rule 455, and the traditional components of a new source review rule - BACT and trade-offs.

The control strategy embodied in Rule 455 is designed to achieve and maintain the H_2S standard, while still allowing for the construction of new sources. It therefore includes a "growth increment" for new sources -an approach which is contemplated in Section 173(1)(A) of the Clean Air Act as an alternative to an emissions trade-off approach. The control strategy establishes a timetable for reducing emissions from existing sources, and was designed to achieve sufficient reductions in H_2S emissions, at an early enough date, to allow the growth in generating capacity which has been forecast by the utilities. The control strategy also sets emissions limits for these new sources at a level which allows attainment and maintenance of the ambient standard even with the new sources in operation.

This differs from the traditional air pollution control approach, under which a control strategy is designed only to attain the ambient air quality standards, based on an existing emissions inventory. No "growth increment" is normally included in such a strategy, and a New Source Review rule is used to require case-by-case emissions trade-offs for new sources to provide for maintenance of the ambient air quality standards.

However, the approach of requiring each new source to find its own trade-offs seemed to present special difficulties in the geothermal area. Since the violation of the H_2S standard is caused by only one kind of source, and since virtually all sources of H_2S emissions in the area are associated with a single owner, the trade-off requirement of a New Source

Review rule would likely restrict development of the geothermal resources to only that owner. The owner would want to retain its potential trade-offs for its own use, and would have no incentive to make them available to others. In contrast, control strategy contained in Rule 455 in effect requires "community-wide" trade-offs to provide for the growth of geothermal developments in the area. Thus, we believe the trade-off provisions of Rule 230 need not apply to new geothermal power plants, provided:

1) The new source and all associated facilities comply with the emission limitations of NSCAPCD Rule 455;

2) The emissions from the new source will not cause a local violation of the H_2S ambient standard. Due to location, topography, meteorology, source size, steam quality and proximity to other sources or to receptors, the emission rate from a new source may have to be controlled to a higher degree than specified in the emission limitations required by Rule 455 in order to preclude a violation of the H_2S standard; and

3) Existing sources operated by the applicant are in compliance with all applicable limitations of Rule 455.

With respect to the BACT issue, we believe that although the District could issue a permit if Unit 17 complied with the emissions limitations set forth in Rule 455, the District could also require more stringent controls if such controls constituted Best Available Control Technology. While Rule 455 establishes emissions limitations applicable to a category of sources, the BACT requirement is specifically intended to be made on a case-by-case basis, reflecting the state of control technology at the time the application for a permit to construct is filed with the District. Thus, if the District

is able to identify BACT as being a control technology which is more stringent than the categorical emissions limitations set forth in Rule 455, the District could condition the permit for Unit 17 on the use of such technology. Furthermore, if compliance with the control strategy limitations alone will not prevent a local exceedance of the standard (see provision #2 in preceding paragraph), the use of BACT may remedy this problem without requiring emissions trade-offs.

Respectfully submitted,

Kathleen Kahn

Kathleen Kahn
Staff Counsel

December 19, 1978

State of California

Memorandum

78-NOI-5

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

Date : December 20, 1978

Subject: Comments on Preliminary Report on the Northern California Power Agency's Notice of Intent to Seek Certification for NCPA Geothermal Project No. 2 (Docket No. 78-NOI-5)

ENERGY COMMISSION RECEIVED
DEC 26 1978

From : Air Resources Board

Harmon Wong-Woo, Chief
Stationary Source Control Division

Our comments pertain to the air quality section of the Preliminary Report. These comments are similar to those submitted for Geysers Unit 17 (Docket No. 78-NOI-3).

The report indicates that the Board has taken the position that NSCAPCD Rule 455 (the control strategy) "effectively preempts the BACT and emission offset provisions of Rule 230" (New Source Review). It further indicates an apparent conflict between the Board and District on this issue, since the District believes that the emissions limitation of NSCAPCD Rule 455 constitutes BACT. As stated in our "Comments on Final Report" for Geysers Unit 17, this conflict is more apparent than real. The ARB staff did not intend, by its August 1, 1978 memorandum on Geysers Unit 17, to imply that the District is any way prevented from requiring BACT on new geothermal sources.

We will briefly discuss the relationship between the control strategy and new source review. The control strategy contained in Rule 455 is designed to achieve and maintain the H_2S standard, while still allowing the construction of new sources. The control strategy established a timetable for reducing emission from existing sources to allow for the growth in generating capacity consistent with the growth forecasts made by the utilities. Additionally, the control strategy sets emission limits for new sources which allow for attainment and maintenance of the ambient H_2S standard.

Normally, a control strategy is designed to attain the ambient air quality standards based on an existing emissions inventory. The traditional control strategy does not include "growth increments", and therefore, relies on a New Source Review rule to require, on a case-by-case basis, the necessary trade-offs (offsets) to mitigate the impact of new sources and thus maintain compliance with the ambient air quality standards.

The traditional approach of requiring each new source to find its own off trade-offs appears to present special difficulties for the Geysers area. The violation of the H_2S standard is caused by one kind of source, and virtually all H_2S emission sources in the Geysers area are owned by a single company. The trade-off requirement of the new source review rule would likely restrict development of the geothermal sources to that company and preclude development

by others such as NCPA. In contrast, the control strategy requires "community wide" trade-offs to provide for the growth of geothermal development within the area. Thus, we believe that the case-by-case trade-off provisions of Rule 230 would not be applicable to new geothermal power plants provided:

1) The new source and all associated facilities comply with the emission limitations of NSCAPCD Rule 455;

2) The emissions from the new source will not cause a local violation of the H_2S ambient standard. Due to location, topography, meteorology, source size, steam quality and proximity to other sources or to receptors, the emission rate from a new source may have to be controlled to a higher degree than specified in the emission limitations required by Rule 455 in order to preclude a violation of the H_2S standard; and

3) Existing sources operated by the applicant are in compliance with all applicable limitations of Rule 455.

With respect to the BACT issue, we believe that although the District could issue a permit if NCPA Geothermal Project No. 2 complied with the emissions limitations set forth in Rule 455, the District could also require more stringent controls if such controls constituted Best Available Control Technology. While Rule 455 established emissions limitations applicable to a category of sources, the BACT requirement is specifically intended to be made on a case-by-case basis, reflecting the state of control technology at the time the application for a permit to construct is filed with the District. Thus, if the District is able to identify BACT as being a control technology which is more stringent than the categorical emissions limitations set forth in Rule 455, the District could condition the permit for NCPA Geothermal Project No. 2 on the use of such technology. Furthermore, if compliance with the control strategy limitations alone will not prevent a local exceedance of the standard (see provision #2 in preceding paragraph), the use of BACT may remedy this problem without requiring emissions trade-offs.

cc: Steve Burger
California Energy Commission

Norman P. Ingraham
Northern California Power Agency

Dave Meith
California Energy Commission

DA comment

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Area Geothermal Supervisor's Office
Conservation Division, MS 92
345 Middlefield Road
Menlo Park, CA 94025

RECEIVED
JAN 11 1979
HEARING ADVISOR
78-NOI-5

JAN 4 1979

ENERGY COMMISSION
RECEIVED
JAN 10 1979

Energy Resources Conservation
and Development Commission
Attn: Ms. Kathy Matthews
1111 Howe Av.
Sacramento, CA 95825

Gentlemen:

We have reviewed the Preliminary Report on NCPA's Notice of Intention to Seek Certification for the NCPA Geothermal Project No. 2 (78-NOI-5) (dated December, 1978). Our review was limited to those sections devoted to biological resources, soils, hydrology and water resources, and geotechnical issues as they relate to structural design. Our comments pertain to only two items.

First, we are holding our specific comments on the biological resources discussion in abeyance pending our review of the applicant's detailed mitigation plan. This plan was scheduled to be completed by November 30, 1978.

Second, we have reviewed the measures and proposals outlined in the findings and conclusions regarding soils and we are in agreement. Since drill pad Q_1 remains to be constructed we would, however, request that the "Specifications for the Preparation for Drill Sites and Access Roads" as presented in the Castle Rock Springs EIR be supplemented with the more recent data and information developed by Shell Oil Company and presented in the Supplemental Plan of Operation addressed in U.S. Geological Survey Environmental Analysis Number 95-8.

Should you have any questions regarding our review, please don't hesitate to contact us.

Sincerely,

Barry A Boudreau

Acting Area Geothermal Supervisor

78-NOI-[illegible]

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT
141 NORTH STREET, HEALDSBURG, CA. 95448
(707) 433-5911 or (707) 433-5742

Northern California Power Association
% Chuck Schnautz
P. O. Box 1237
Healdsburg, Ca., 95448

SUBJECT: NCPA/Shell Oil proposed plant site and air quality study.

Dear Mr. Schnautz:

I have evaluated the M.R.I. proposal, the letter from Lake County Air Pollution Control District (by Steve Zaluski) and the site. It appears downwash would be impossible to evaluate by any other means other than by tracer release. Also it appears your chosen site might affect the Sonoma County side and should be analyzed the same. In regards to drainage, I am extremely concerned about impacts in the Jimtown-Pine Flat Rd. area; therefore, I recommend a tracer release since no tracer releases have ever been made toward the Sonoma side, (your southerly site has more potential to drain toward Alexander Valley area than the existing development).

If you have any questions, please contact our offices at (707) 433-5991.

Sincerely,

MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MWT/ak

P.S. Please apply for an authority to construct because this office's participation with the Energy Commission will be limited and the permit process is the only way we will get involved (see attached letter).

cc: Steve Zaluski, Lake County Air Pollution Control District
Jeff Anderson, Energy Commission, Sacramento

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT

141 NORTH STREET, HEALDSBURG, CA. 95448

(707) 433-5911 OR (707) 433-5742

January 12, 1979

Chuck Schnautz
Northern California Power Agency
P.O. Box 1237
Healdsburg CA 95448

SUBJECT: TRACER RELEASES FOR NCPA/SHELL GEOTHERMAL PROJECT

Dear Mr. Schnautz:

In an office conference held December 11, 1978, a number of issues relative to the air quality impact issues were raised and discussed as follows:

1) two tracers have already been released on behalf of the project and the results appear to be adequate for limited vertical mixing meteorological situations;

2) the project location is conducive to downwash of emissions into lower elevations and receptor sites both to the east and west; therefore, a tracer should be conducted for each direction at 4 to 10 m/s wind velocity and at a release height of 20 meters;

3) there is still a question as to plume rise from a cooling tower and a "rock muffler" under stacking conditions, but this question is being pursued in another adjacent study;

4) the project location and the expected plume rise from the cooling tower and a "rock muffler" stacking situation appear to preclude emissions from entering a drainage flow, therefore, a tracer need not be done; and

5) geothermal wells developed by Shell Oil Company would most likely be developed below ridgeline height and emissions would be entrained in drainage flows; therefore, Shell Oil Co. should be approached to fund such a tracer release in the Sonoma direction (Lake already has a number of such releases in their direction from adjacent areas).

If there are any corrections or questions, contact me at (707)433-5911.

Sincerely,

Michael Wolmasoff

MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MWT/mad

State of California

Memorandum

To : Office of the Secretariat 78-NOI-5
California Energy Commission
1111 Howe Avenue
Sacramento, California 95825

Date: January 12, 1979

ENERGY COMMISSION RECEIVED
JAN 16 1979

From : Department of Fish and Game

Subject: CEC, Preliminary Report, NCPA Geothermal Project No. 2

The Department of Fish and Game has reviewed the report as transmitted by the Committee on September 6, 1978, and strongly concurs that the project may have a "substantial adverse impact" upon the environment. We fully support the intent of the Memorandum of Understanding, Appendix B, for studies to determine the answers to specific questions regarding project impacts.

In the preparation of such studies, we request specific discussion and resolution of all items contained in our October 3, 1978 response on the NOI (Appendix D).

We further request specific comments and mitigation measures consistent with the items outlined by the U. S. Fish and Wildlife Service's response to the NOI of September 19, 1978 (Appendix D).

As stated in the report, Department of Fish and Game personnel will assist the Staff in addressing biological resources concerns. To arrange a meeting, please contact Mr. Theodore W. Wooster, Environmental Services Supervisor, Region 3, Department of Fish and Game, Post Office Box 47, Yountville, CA 94599, telephone (707) 944-2443.

E C Jurgenson
Director

APPENDIX D

Exhibit List

185B:08 R2

2/8/79

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 78-NOI-5
	)	
Notice of Intention to File An Application for Certification for 110 MW Geothermal Power Plant, NCPA Geothermal Project No. 2.	)	Exhibit List

Exhibit Number

1. Notice of Intention. Marked for identification and admitted January 22, 1979. Submitted by Martin McDonough, General Counsel for NCPA.

2. Staff Position Papers, dated and docketed 10/27/78. Submitted by Matthew Brady, California Energy Commission. Marked for identification and admitted January 22, 1979.

3. Response of the Commission Staff to Committee Hearing Order containing, inter alia, supplemental position papers and declarations, dated and docketed 1/15/79. Submitted by Matthew Brady, California Energy Commission. Marked for identification and admitted January 22, 1979.

4. Declarations Supportive of Applicant's Position, Second Set, submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

5. Declarations Supportive of Applicant's Position, Third Set, submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

6. Verification of Steve H. McVeigh in Support of Findings and Conclusions, submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted on January 22, 1979.

7. Declaration of Robert O. Webster, SAI Engineers, on NCPA Responses to Orders No. 3 and No. 5 of the Notice of Evidentiary Hearing and Hearing Order, dated 12/22/78, docketed on 1/16/78. Marked for identification and admitted on January 22, 1979.

8. Response to Staff Data Request of 9/6/78--NCPA/Shell Geothermal Project No. 2, docketed on 10/24/78. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

9.& 10. These two exhibits are in a packet together with a cover letter from SAI Engineers, dated 12/15/78. Number 9 is the NCPA Response to Data Request of CEC Staff, Inquiry 5 (a----e): Cooling Tower Drift Study. Number 10 is NCPA Response to Preliminary Report Finding 10 on Biological Resources. Attached to Exhibit #10 are two drawings: #F-C-00-008, "Grading and Drainage Plan", and #F-C-00-006, "Site Topographic Plan." Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted Janauary 22, 1979.

11.a. NCPA Response to Preliminary Report Finding No. 7 on Water Quality: Sewerable Waste Disposal, dated 1/5/79. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

11.b. NCPA Response to Preliminary Report Finding No. 7 on Water Quality: Non-sewerable Wastes Disposal, dated 1/5/79, and docketed 1/10/79. Submitted by Martin McDonough, General Counsel for NCPA. Attached to Exhibit #11.a. are two drawings, #F-G-00007, "Waste Products Flow Diagram", and #F-G-00-003, "Cycle Arrangement--One 55 MW Unit." Marked for identification and admitted on January 22, 1979.

12. Cultural Resources Study of NCPA/Shell Transmission Line Right-of-Way, dated 12/18/78. Written by David Frederickson, submitted to SAI Engineers, for NCPA. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted on January 22, 1979.

13. Declaration of David Frederickson, actually filed on January 29, 1979. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

14. Late file of a Safety and Reliability Declaration from NCPA. Declaration of Gordon Needham, actually filed on January 25, 1979. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

15. Minute Order--Lake County Board of Supervisors Meeting of December 19, 1978. Submitted by Martin McDonough, General Counsel for NCPA. Marked for identification and admitted January 22, 1979.

185B:08 R2

2/8/79

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 78-NOI-5
	)	
Notice of Intention to File An Application for Certification for 110 MW Geothermal Power Plant, NCPA Geothermal Project No. 2.	)	Exhibit List

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APPENDIX E

Proposed Decision

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	)	Docket No. 78-NOI-5
	)	
Notice of Intention of NORTHERN CALIFORNIA POWER AGENCY to File an Application for Certification Re: NCPA Geothermal Project No. 2.	)	PROPOSED DECISION

On March 2, 1979, the Committee assigned to this proceeding issued its Final Report pursuant to Public Resources Code section 25514. A public hearing was held before the full Commission on March 14, 1979, in Sacramento. After considering the comments made at that hearing, the Final Report prepared by the Committee, the evidence and comments presented in the course of hearings and conferences during the Notice of Intention process, and documents entered in the record of the Notice proceedings, the Commission hereby approves the Notice of Intention, subject to the 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 and the analysis contained in the Final Report. Furthermore, no party, public agency, nor member of the public has seriously contested or objected to approval of the Notice, and the Commission is aware of no substantial reason why the Notice should not be approved.

The Commission hereby makes the following Findings and Conclusions:

1. The proposed project conforms with the Commission's 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 ORDERS the Applicant, Northern California Power Agency, 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 and New Source Review

a) The Applicant shall provide sufficient operating data from Pacific Gas and Electric Company's Unit 15 in order to determine, with reasonable certainty, that the partitioning efficiency of the surface condenser will be adequate to meet a 100 grams/gross Mwh H_2S emissions limitation without condensate treatment. In the event that such data are not available, or should the partitioning efficiency be insufficient to meet a 100 grams/gross Mwh H_2S emissions limitation, then the Applicant shall provide specific proposals for condensate treatment

systems which would be installed prior to the commercial operation of the proposed power plant.

b) The Applicant shall obtain and provide detailed information demonstrating the engineering feasibility of the automated flow control valve to reduce H_2S emissions in conformity with NSCAPCD Rule 455(b).

c) The Applicant shall perform an air quality analysis and a meteorological study sufficient to meet the concerns expressed in the Air Quality, Air Quality New Source Review, and Public Health Findings and Conclusions contained in the Final Report.

II. Public Health

a) The Applicant shall include a proposal specifying the manner in which ambient H_2S concentrations will continue to be monitored in the vicinity of the proposed project. This monitoring program should also verify that concentrations of radon-222 from plant operations remain below applicable standards.

III. Safety and Reliability

a) The Applicant will submit emergency response procedures and shut-down criteria that will be followed by the control operator.

IV. Soils

a) The Applicant shall provide specific designs and schedules for implementation of soil loss and erosion control measures.

V. Structural Design

a) The Applicant shall submit seismic criteria, site responses, and representative design spectra as stated in the Findings and Conclusions of the Final Report. The Applicant shall also submit a report and the conclusions reached, to the Commission and the U.S. Geological Survey, dealing with Structural Design issues as specified in the Final Report.

b) The Applicant shall submit a detailed report on the fundamental period of the structures to be designed.

c) The Applicant shall submit a report containing the conclusions reached on seismic design criteria developed, in part, through the use of SHAKE, TRAVEL, and/or FLUSH computer programs.

VI. Transmission Line

a) The Applicant shall submit a copy of the transmission service (wheeling) agreement reached with Pacific Gas and Electric Company or, if no agreement has been reached, a status report on the negotiations.

b) The Applicant shall submit a study regarding additional methods of transmitting the power from the proposed project out of the Geysers.

VII. Water Quality

a) The Applicant shall submit detailed design criteria for the impermeable barrier and liner which would surround the proposed plant.

b) The Applicant will submit the specific details of its proposal for disposal of all liquid wastes, including location and delineation of proposed facilities and their operational capabilities.

c) The Applicant shall demonstrate compliance with the North Coast Regional Water Quality Control Board Order 74-151 ("Contingency Planning and Notification Requirements for Accidental Spills and Discharges").

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 on the proposed project.

APPROVED: _____