

CALIFORNIA ENERGY COMMISSION

MASTER

**SUMMARY AND
HEARING ORDER**

**NORTHERN CALIFORNIA POWER AGENCY'S
NOTICE OF INTENTION**

**TO SEEK CERTIFICATION FOR
NCPA GEOTHERMAL PROJECT**

79-NOI-1



DECEMBER 1979

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**ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION**

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December 21, 1979

The California Energy Resources Conservation and Development Commission, through the Commission Committee assigned to the Northern California Power Agency's Notice of Intention to file an Application for Certification of the NCPA Geothermal Project No. 1 (79-NOI-1), hereby submits its Summary and Hearing Order pursuant to Public Resources Code sections 25510 and 25512.

A handwritten signature in black ink, reading "Ronald D. Doctor".

RONALD D. DOCTOR, Commissioner
and Presiding Member of the
Committee

A handwritten signature in black ink, reading "James A. Walker".

JAMES A. WALKER, Commissioner
and Member of the Committee

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I. Introduction

A. The Summary and Hearing Order

1. Contents

The Summary and Hearing Order, required by Section 25512 of the Public Resources Code, is based on the record of the Notice of Intention (NOI or Notice) proceedings. It is intended to summarize the principal issues raised in the proceeding to date and identify: 1) issues to be adjudicated in subsequent hearings, 2) issues which have been eliminated from the proceedings, and 3) issues which should be deferred until the certification process. The Summary and Hearing Order also sets forth Proposed Findings on many of the issues which may be incorporated in the Final Report.

2. Evidentiary Basis

This Summary and Hearing Order is based on evidence presented during hearings and conferences on the Notice, comments submitted to the Commission by local, regional, state, and federal agencies and the public, and upon independent studies conducted by the Commission Staff.* Evidence presented in these proceedings includes position papers prepared by the Commission Staff on various issues, supporting affidavits submitted by the Applicant, and a Joint Statement of Findings and Conclusions (Joint Statement) proposed to the Committee by the Applicant and the Staff for adoption and incorporation into the record. The Committee gave all those interested in the proceeding an opportunity to question or object to any Finding or Conclusion proposed for adoption in the Joint Statement.

*Supporting documents and transcripts are on file and available for review at the California Energy Commission Secretariat.

3. Opportunity for Response

Written responses to the Summary and Hearing Order may be filed within 30 days of publication, and the Committee may hold a public conference to consider amendments to the document after its publication. Each party should take advantage of this opportunity to comment on, or express its intent to contest, or amend any Proposed Finding contained in this Summary and Hearing Order.

Hearings conducted following the issuance of this Order will lead to the issuance of a Final Report and, within a short period thereafter, to approval or disapproval of the Notice by the Commission. If the Notice is approved, NCPA may then file an Application for Certification of the NCPA Geothermal Project No. 1. Following further proceeding on the Application, the Commission will act to grant or deny certification.

Any person who, after reading this Summary and Hearing Order, feels he or she may have an interest which would be served by participating as a party to these proceedings may petition the Committee for leave to intervene. Assistance for gaining intervenor status may be obtained by calling Dan Parker of the Commission's Public Adviser's Office at (916) 920-6906 or toll free (800) 852-7516.

B. Description of the Proposed NCPA Geothermal Project No. 1

1. The Applicant

The Northern California Power Agency is a joint powers agency organized to provide electrical power to its members which include the Cities of Redding, Roseville, Biggs, Gridley, Ukiah, Healdsburg, Alameda, Lodi, Lompoc, Palo Alto and Santa Clara. The Plumas-Sierra Rural Electric Cooperative is an associate member. The Agency is governed by a Board of Commissioners made up of officials

from each of the member cities. Thus far, NCPA has purchased all the power necessary to supply its members. It now feels the need to produce its own power, thereby allowing it to provide its members electricity at the lowest possible rates.*

2. The Facility

The NCPA Geothermal Project No. 1, proposed for construction in The Geysers area of Lake County, is a dry steam geothermal power plant with a gross operating capacity of 66 MW. It is designed to consist of two 33 MW turbine/generator units and their auxiliary equipment. In addition to the turbine/generator building, the proposed power plant will include a Stretford H₂S abatement system, cooling tower, substation, service, and storage facilities. The plant is scheduled for operation in 1983.

Transmission lines to connect the power plant with main transmission lines out of the area would consist of a 230 KV tap-line from the plant site to the proposed Department of Water Resources (DWR) Bottle Rock Plant.** The tap-line will be 1.5 miles long consisting of steel lattice type transmission towers. At this time the major transmission facilities in The Geysers are owned by Pacific Gas and Electric (PG&E).*** It will therefore be necessary for NCPA to enter a wheeling agreement with PG&E and DWR in order to wheel their power into the Northern California integrated transmission system.

*NCPA has also applied to the Energy Commission for certification of a 110 MW geothermal power plant. Final action on the Application for Certification is expected in April 1980.

**This plant is in the AFC proceeding stage before the Commission and is expected to be certified in April 1980.

***PG&E has applied to construct an additional major transmission line in.

3. The Site

The NCPA Geothermal Project No. 1 is located on private lands within Lake County, California. The project site is in the northern extension of The Geysers Known Geothermal Resource Area (KGRA). The leasehold consists of approximately 1,400 acres distributed irregularly in Sections 20, 21, 22, 28, 29, 30, 32, and 33 of Township 12 North, Range 8 West of Mount Diablo Base and Meridian, and centered principally in Sections 28 and 29.

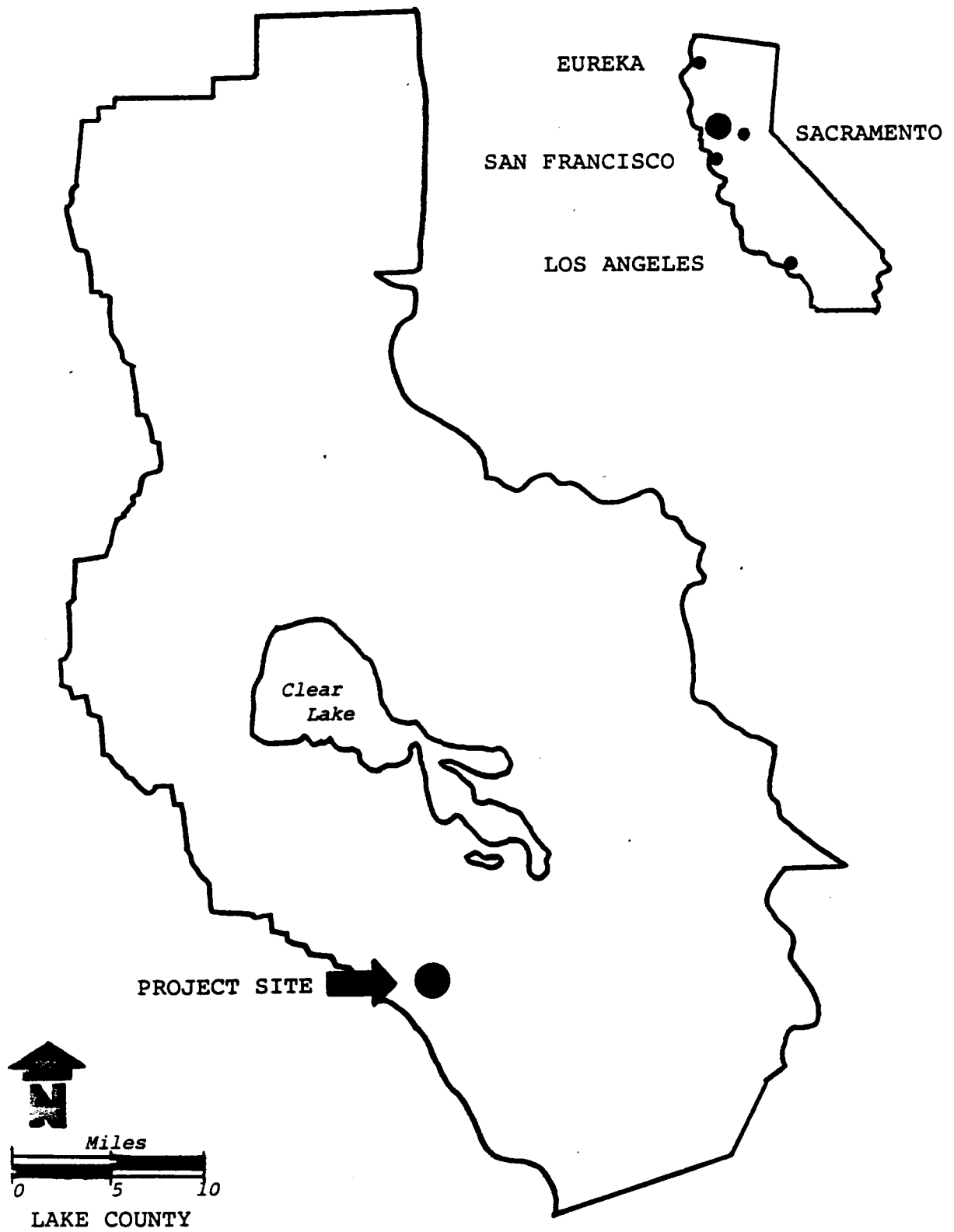
The leasehold straddles Bottle Rock Road at the community of Glenbrook. The community of Cobb is approximately 2-3/4 miles to the southeast and the town of Kelseyville is 10 miles to the northwest. The City of Lakeport, located approximately 16 miles northwest of the project, is the only incorporated city in Lake County and is the county seat.

Of the three plant site locations identified by the Applicant, site 3 has been identified by both Staff and Applicant as the most environmentally acceptable. The site is located at an existing topographic knob from which a flat plant site would be established by reduction of the knob and engineered fill at the perimeter of the site. Due to the nature of the steam resource, a geothermal power plant must usually be located within one mile of all production wells feeding it. Plant site 3 meets this requirement.

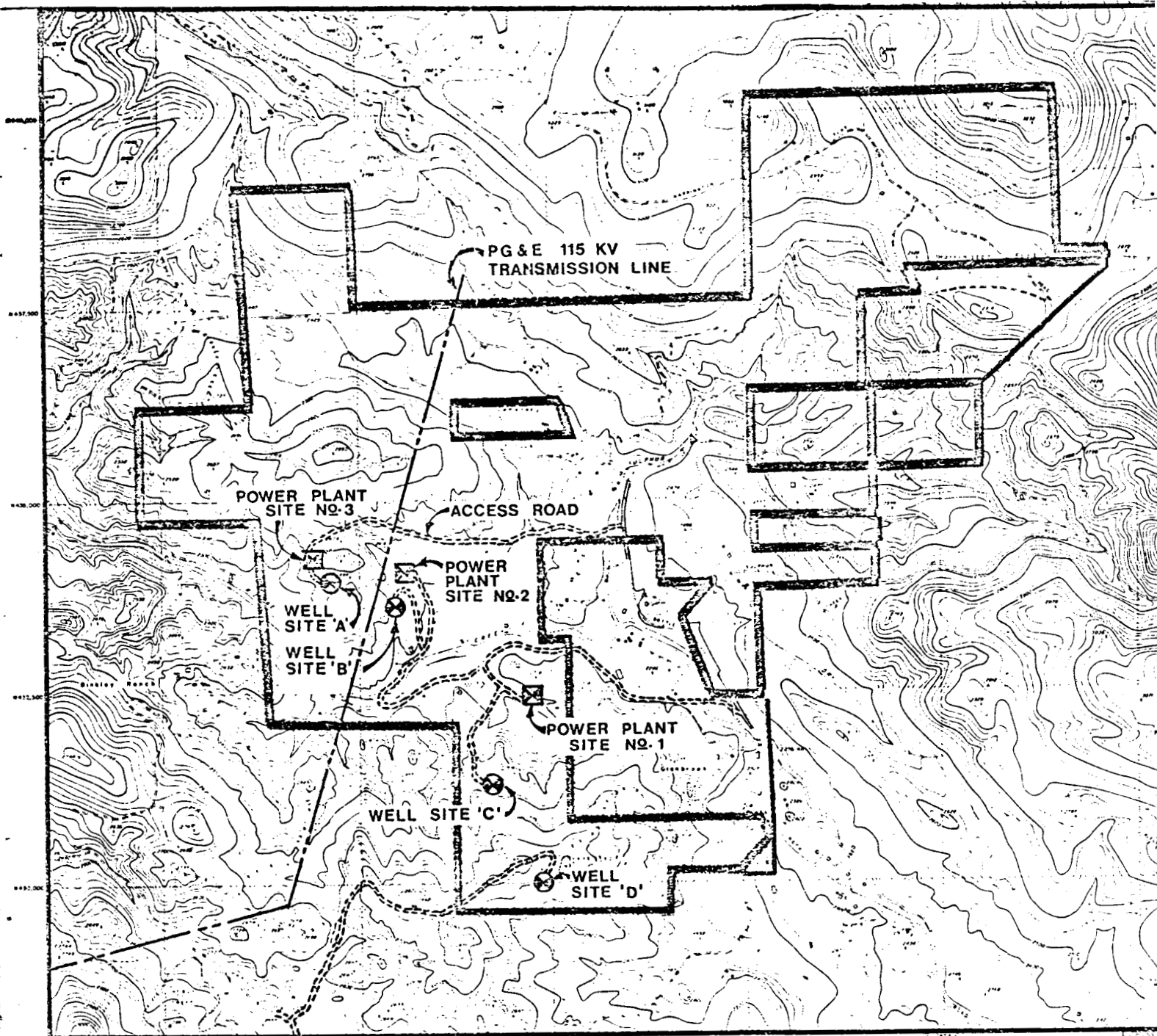
4. The Steam Field

A large reservoir of geothermal steam exists in The Geysers Known Geothermal Resources Area (KGRA). This natural resource is presently being used by PG&E to generate 663 MW of electric power.*

*To date NCPA has drilled one well and has not as yet produced sufficient steam from the well to be considered commercial quantity.



PROJECT VICINITY MAP



NCPA NO.1 LEASEHOLD

Well sites must be located according to the underlying geologic structures from which the geothermal steam sources may be developed. However, the steep slopes, poor accessibility and environmental constraints of The Geysers area limit the number of suitable areas for drilling. As a result, once a successful well site has been found, numerous wells may be drilled from a single drilling pad in order to develop the steam source with minimum disturbance to the immediate area.

C. Summary of the Hearing Record

1. Submittal of Notice of Intention

On June 18, 1979, the Northern California Power Agency (NCPA) filed with the Commission a Notice of Intention (NOI) to file an Application for Certification (AFC) for its geothermal Project No. 1. On July 18, 1979, the full Commission voted to accept the NOI subject to the condition that NCPA provide additional information to adequately meet the NOI filing requirements. The supplemental information was submitted, as required, by August 31, 1979.

Subsequent to accepting the NOI, the Commission appointed a committee to conduct proceedings on the NOI. Due to the departure of several Commissioners and their subsequent replacement, the Committee was modified and is now composed of Commissioner Ronald D. Doctor, Presiding, and Commissioner James A. Walker.

Timeline of Events

Site Visit	April 19, 1979
NOI Filed	June 18, 1979
Commission Accepted NOI	July 18, 1979
Public Workshops	July 23 and August 10, 1979
Informational Hearing	August 24, 1979
NOI Supplement Submitted	August 28, 1979
Prehearing Conference Statement	
Workshop	October 1, 1979
Second Informational Hearing	
and Site Visit	October 12, 1979
Prehearing Conference Statement	
Workshops	October 24, 1979
Prehearing Conference	November 8, 1979
Public Workshop on Air Quality	November 9, 1979
Nonadjudicatory Hearings	November 19 and 20, 1979
Summary and Hearing Order	December 21, 1979
Public Conference on Summary	
and Hearing Order	January 10, 1980
Adjudicatory Hearings	January 30 and 31, 1980*
Hearing on Financing and	
Economics	January 31, 1980*
Final Report	February 18, 1980*
Committee Meeting on Final	
Report	February 28, 1980*
Commission Hearing and Decision	
on Final Report	March 3, 1980*

*Tentative.

2. Petitions to Intervene

Thus far two parties have petitioned the Committee for leave to intervene in the NOI proceedings. The Committee received the petition of Camp Beaverbrook on October 26, 1979, and issued its Order Granting Leave to Intervene on November 6, 1979. The County of Lake petitioned the Committee on November 16, 1979, and was granted intervenor status on November 23, 1979.

In keeping with Commission regulations, any person wishing to comment either orally or in writing has been given the opportunity to do so by the Committee. However, once granted intervenor status, the person becomes a full party to these proceedings, with all the rights and obligations of any other party.

3. Issue Workshops

On July 23, August 10, October 1, 24, and November 9, 1979, informal public workshops were held in Sacramento and Lakeport to discuss issues and concerns related to the proposed project. As a result of those workshops, Staff prepared a series of position papers on issues including: cultural resources, public health, air quality, socioeconomics, need/demand conformance, water quality, hydrology and water resources, waste disposal, soils, safety/reliability, noise, biological resources, geology, and seismicity, transmission lines, and civil and structural engineering.

The purpose of the workshops was to allow the Commission staff and the Applicant to work on the preparation of Joint Findings of Fact and Conclusions for those issues on which there was agreement and to identify areas which require further information before reaching a resolution. In this way the parties may avoid unnecessary consideration, in adjudicatory hearings, of issues not actually in

dispute. However, the workshops are not intended to foreclose issues and the Committee is not bound by the joint agreements resulting from the workshops.

At the conclusion of the Prehearing Conference Statement workshops, the Staff and the Applicant agreed on a Joint Prehearing Conference Statement setting forth agreed upon facts concerning all issues discussed in this Summary and Hearing Order with the exception of the financial impacts of the project.

4. Informational Presentations

Pursuant to Public Resources Code Section 25509, the Committee conducted public Informational Presentations on August 24, 1979, and October 12, 1979, in Lakeport 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 and invited general comments and expressions of concern about the proposed project.

5. Site Visits

To further provide knowledge and understanding of the proposed facility and its location, site visits were conducted on April 19, 1979, and on October 12, 1979. The Staff, Applicant and any members of the public who wished to attend explored the proposed drilling pad and power plant site.

6. Prehearing Conference

On November 8, 1979, the Committee held a Prehearing Conference in Sacramento 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 gave those present an opportunity to state whether they intended 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 for those present to state their intention to present a witness on any issue in subsequent evidentiary hearings.

At the time of the Prehearing Conference, Lake County had not yet petitioned the Committee for leave to intervene. However, the Public Advisor indicated at the Conference that Lake County planned to intervene due to their concerns regarding issues of public health, noise and socioeconomic impacts.

Camp Beaverbrook informed the Committee that it planned to question the Applicant's witnesses regarding the project's impacts on socioeconomic resources, soil erosion, local biological resources, noise, water quality and whether steam removal could possibly activate the Callayomi fault. Camp Beaverbrook also indicated its concern over the proposed facilities' possible impact on air quality and public health, specifically regarding the impact which airborne steam pollutants could have on the health of young active children attending Camp Beaverbrook.

Commission staff indicated that it would provide witnesses to address most of the subject areas and that staff would particularly question the Applicant on the adequacy of its biological impact inventory.

7. Nonadjudicatory Hearings

The Committee conducted public Nonadjudicatory Hearings on November 19 and 20, 1979, in Lakeport. These hearings were conducted pursuant to Public Resources

Code Section 25509.5 and were utilized to set forth the demand basis for the plant, to provide further understanding of the facilities and the site, to gain input from the public, parties and governmental agencies regarding the impacts of the plant and to explore alternatives where needed.

At the hearings the Staff and Applicant each presented their respective positions on the areas covered in the Joint Statement and made formal offers of proof such as written testimony and supporting documents which formed the evidentiary basis for these positions. The Committee afforded those present the opportunity to challenge, rebut or cross-examine every witness for each subject area.

At the time of the hearing Lake County had petitioned for intervenor status and, though an Order granting that status had not yet been issued, the Committee accorded Lake County all the rights of an intervenor. Lake County was represented throughout most of the two day hearing and frequently exercised its right to question witnesses. During the course of the hearings the Committee received statements from Lake County representatives Don Pape of the County Planning Department, Mary Jadiker of the Planning Commission, Doris Wilcox from the Board of Supervisors and County Tax Assessor Verdon Strong.

The other intervenor in the case, Camp Beaverbrook, was represented throughout both days of hearings by camp co-owner Lynn Garrison who questioned the witnesses.

During the presentation on air quality it became clear that the Lake County APCO and NCPA disagreed on whether the NCPA 1 project must be analyzed for air quality purposes in terms of the project's cumulative impact along with other

power plants in Cobb Valley.* The Committee later heard testimony from Bob Reynolds, Lake County APCO, to the effect that he will endeavor to apply a cumulative analysis to the project. A detailed discussion of this issue and the Committee's resolution thereof is contained in section II.B.1. of this Summary and Hearing Order.

The issue of socioeconomics was addressed initially by the Applicant and later by Staff, at the November 19, 1979, hearing. At the time of the Applicant's presentation, no one representing Lake County was in attendance at the hearing. After discussion by the parties, the Committee determined that because Lake County's Petition to Intervene concentrated heavily on its concern over socio-economic impact, Lake County had seriously prejudiced its position by failing to attend the hearing. The Committee therefore requested the Public Adviser to determine whether Lake County wished to present its position on socioeconomics at a later time. Staff noted that its witness on that issue could not be present the following day, and therefore, Staff would be disadvantaged by reopening the issue at Lake County's behest. The Committee nevertheless reopened the subject of socioeconomic impact for a presentation by Lake County on the following day, November 20, 1979. Other issues discussed at the Non-adjudicatory Hearing are discussed in following sections of the Summary and Hearing Order.

II. Site Related Issues

A. Introduction

Public Resources Code Section 25512 requires that the Summary and Hearing Order summarize the principal significant environmental effects of each siting

*These plants include PG&E Geysers 17 and DWR Bottle Rock.

proposal, discussing alternatives and mitigation of adverse effects. However, Public Resources Code Section 25540 eliminates the requirement that geothermal plant NOI's contain alternative sites. While NCPA has three candidate power plant sites within their leasehold, both the Staff and Applicant have taken the position that considering all site characteristics, plant site No. 3 is the most desirable. Therefore, the analysis of site related issues which follows will focus on plant site No. 3.

The Summary and Hearing Order is designed to briefly describe the environmental issues which should be addressed in the NOI. The principal environmental effects of a project are described along with reasonable alternatives and mitigation measures to reduce any substantially adverse impacts. In addition, the document sets forth proposed findings on matters relevant to the final report.

B. Environmental Issues

1. Air Quality

As a result of the relatively high concentration of hydrogen sulfide in most sources of geothermal steam and the air mixing features in the Cobb Valley, air quality is an important issue in these proceedings. The Committee's concern is not diminished by the fact that, to date, the Applicant has not discovered steam in commercial quantities sufficient for air quality analysis. Energy Commission regulations allow the Applicant to progress through the NOI process without a proven steam resource. However, there must be a showing of reasonable likelihood that the Applicant will be able to comply with air quality standards for the area.

H₂S emissions in the steam are addressed by 1) legal limits on the amount which a plant may emit per gross megawatt hour and 2) prohibitions against a new plant making a measurable contribution to existing pollution. (See finding no. 3 which follows). The NCPA 1 plant is presently scheduled to emit no more than 100 grams per gross megawatt hour. This will be accomplished through the use of a Stretford H₂S abatement system and a H₂O₂/Fe catalyst condensate treatment system.

At the nonadjudicatory hearings testimony was received regarding the inability of the Stretford abatement unit at PG&E's Geysers 15 to operate at its full rating. A similar abatement unit is planned for use at NCPA 1. The Committee was also informed of the possibility that NCPA's allowable level of H₂S emission could be drastically

reduced due to the operation of The Geysers 17 and DWR Bottle Rock plants. NCPA and the Lake County APCO are in apparent disagreement over whether Rule 602 of the Lake County Air Pollution Control District Regulations direct the APCO to deny an "Authority to Construct" based on the cumulative effects of more than one contemplated geothermal project. Another important unknown is the H_2S content of NCPA's as yet unproven steam resource.

While these questions remain unanswered, NCPA has nonetheless stated its belief that compliance with applicable air quality standards is possible. NCPA has also made clear its intention to meet these standards. Staff and Lake County APCD analysis indicates that under a number of scenarios the project will be able to comply. It is stressed however, that the substantial likelihood of compliance may not be assessed until adequate data is submitted regarding the Applicant's steam resource. Since it is unlikely that such information will be available within the time constraints of the NOI process, information indicating the project's ability to comply with all air quality regulations must be submitted at the time of the AFC.

The statements above are in no way meant to prejudice the merits of Lake County's Motion to Consolidate Proceedings in the cases of NCPA 1 and DWR Bottle Rock. This motion seeks consolidation of the two siting cases on the issues of air quality and socioeconomic impact and will be heard before the Commission on January 16, 1980.

PROPOSED FINDINGS

AIR QUALITY

1. NCPA 1 is scheduled to begin operation in 1984.
2. NCPA 1 will have a gross operating capacity of 66 MW.
3. At the time NCPA 1 is scheduled to begin operation, hydrogen sulfide (H_2S) emissions during normal power plant operation must not exceed 100 grams/gross MW hours (14.55 lbs/hr) pursuant to Lake County APCD Rule 421.2(a)(2).
4. The Cobb Valley Tracer Study indicates that, during deep mixing conditions, an emission rate of 100 grams per gross megawatt hour from NCPA's proposed plant would result in a "measurable contribution to an existing violation."
5. The Energy Commission Staff has not yet received information on the power plant steam supply. Prior to or at the AFC filing, NCPA must provide the Staff with a complete steam analysis including but not limited to all available information on 1) the actual concentration of H_2S in the steam, and 2) variation in the flow and composition of the steam.
6. Lake County APCD Rule 602 prohibits new source emissions which would result in "the violations or measurable contribution to an existing violation" of any local, state, or federal air quality standard.
7. Occasional H_2S air quality violations may be occurring in the area impacted by the proposed project.
8. The environmental impacts of emitting 14.55 lbs/hr may be legally unacceptable. NCPA agrees that, if required by the APCD, it will accept a more stringent emission rate.
9. Anticipated cumulative air quality impacts of other proposed local geothermal plants, in combination with NCPA 1, may force NCPA to greatly reduce its proposed H_2S emissions in order to avoid a measurable impact under worst case conditions.

10. Federal Prevention of Significant Deterioration (PSD) requirements may apply to NCPA 1. The EPA may require NCPA to employ best available control technology (BACT) for H_2S .

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

12. A Stretford system, if correctly sized, will treat 99+% of that H_2S which reaches the system in the gas stream.

13. NCPA agrees to provide detailed information on the design criteria and the capacity of the Stretford unit to treat that H_2S at the filing of the AFC.

14. 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.

15. At the filing of the AFC, NCPA agrees to make specific proposals for condensate treatment systems which will be used, should the operating data concerning surface condensers indicate that the partitioning efficiency of such surface condensers is not sufficient to meet the 100 grams/gross MW hour limitation.

16. The air quality affects of NCPA 1 as described by the Cobb Valley Tracer Study are predicated on locating the plant at site number three. Selection of a new site may require an additional air quality analysis.

2. Hydrology and Water Resources

The Committee received testimony and supporting documents showing that after initial start up, the proposed facility will not use any water for its cooling tower other than steam condensate. Relatively small amounts of water will be drawn from wells or from Kelsey Creek for landscaping and other uses. Domestic water may be trucked to the site.

Drainage and runoff systems would be designed for 100 year flood capacity and berms will be used around the site to contain spills and direct runoff.

Staff and Applicant both testified as to the adequacy of the hydrology plans and the insignificance of the project's use of water resources.

PROPOSED FINDINGS

HYDROLOGY AND WATER SOURCES

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

2. The total plant operating need for fresh inland water has been annually estimated at approximately 10 acre-feet during construction and 4 acre-feet for domestic and landscaping uses.

3. The source for the necessary fresh water will be from either trucking water from existing water sources, getting a permit to use water from Kelsey Creek, or drilling of a water well nearby. In any event, the impacts on local water resources would be minimal.

4. The plant site storm drainage system is to be designed for a 100 year storm.

5. The preferred plant site is located 175 feet above Kelsey Creek. There is little surrounding watershed which would generate overland flows and there is no possibility of flood from Kelsey Creek.

6. No adjudication of this issue is necessary for the NOI.

3. Water Quality

The Committee received testimony indicating that all surplus cooling tower water would be reinjected into the steam reservoir, with no geothermal water discharge entering any surface waters. Berms and drains around the plant would contain all spills and rainwater runoff would be directed to settling ponds before flowing into Kelsey Creek. The groundwater needed to supply the project would be no more than that amount used by two suburban homes in a year and would have a negligible effect on groundwater tables.

The plant will use a low-drift cooling tower to limit the amount of condensate droplets carrying harmful airborne salts for short distances. According to Staff the only available information on the impacts of such plume drift shows that the chemicals in the drift have minimal effects on surrounding water supplies. Most are washed from the nearby soils with each rainy season.

PROPOSED FINDINGS

WATER QUALITY

1. The Stretford effluent and cooling tower sludge are likely to contain substances which are classified as toxic and hazardous.

2. The Stretford effluent will be divided into sulfur and the Stretford purge stream. The latter will either be reinjected or disposed of at an approved disposal site. The former will be temporarily stored at the site and disposed of at an approved disposal site.

3. Prior to or at the time of the filing of the AFC, NCPA agrees to provide the specific details for discharge of solid wastes, including location of proposed facilities and analysis of their volume capacities.

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

5. 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.

6. NCPA will conduct a water quality monitoring program required by the Lake County use permit; this program will include the monitoring of biochemical oxygen demand, suspended solids, and heavy metals in the drainage channel below the sedimentation pond.

7. During the AFC, NCPA may be requested to participate in developing a regional monitoring program for the Kelsey Creek watershed in which the potential effects of the proposed DWR Bottle Rock and NCPA 1 facilities are evaluated.

8. NCPA has proposed to construct a retention barrier to surround critical plant areas to contain any spills. The barrier will be impermeable and have a volume larger than any anticipated spill and greater than the

quantity of condensate in the cooling tower basin 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 basin. The area within the retention barrier shall be lined with an impermeable barrier. Prior to or at the time of the filing of the AFC, NCPA agrees to submit:

- a. the detailed design criteria for the retention barrier and liner to assure that the lining has a permeability of less than 1×10^{-6} cm/sec;
- b. the volume of the retention basin surrounding the cooling tower basin and volume of any other spill retention basin(s), and;
- c. the maximum anticipated spill, including criteria for determining this volume and analysis that the retention basin will contain this volume.

9. NCPA has proposed to line and berm the Stretford area with tar or epoxy-coated concrete. NCPA has stated that the bermed area will drain to a sump from which spilled material or rainwater can be pumped to the cooling tower basin or to trucks for off-site disposal. However, these facilities have not been designed. Therefore, prior to or at the filing of the AFC, NCPA agrees to provide details regarding construction of the Stretford area lining and should describe operation of spill containment and disposal system.

10. Domestic waste water will pass through a septic tank into the reinjection system downstream from the condensate collection pond and will be injected into the geothermal reservoir without adversely impacting water quality. Wastes injected into the geothermal reservoir are disinfected by the high temperature and are separated from fresh water aquifers by well casings required by the State Division of Oil and Gas, and natural barriers.

11. Because NCPA has proposed facilities to prevent discharges and has not proposed any permanent on-site waste disposal, the Central Valley Regional Water Quality Control Board (CVRWQCB) will not require the Applicant to file a report of waste discharge. However, the CVRWQCB has requested that the Applicant submit a spill contingency and reporting plan. NCPA agrees to provide this plan prior to or at the time of filing the AFC.

12. There will be no intentional discharge of any toxic or hazardous material into surface waters in quantities sufficient to affect water quality.

13. NCPA agrees to comply with all the provisions of the Porter Cologne Water Quality Act.

14. No adjudication of this issue is necessary in the NOI.

4. Geology and Seismicity

The Applicant has identified all areas near the plant site which show evidence of fault zones or potential seismic activity and will site all structures away from these areas. However, evidence developed in specific Energy Commission sponsored workshops indicates that the nearby Callayomi Fault is not sufficiently active to be a controlling design factor at the site. The more distant Maacama Fault will determine the design standards for maximum credible earthquake.

The Committee also received detailed testimony at the nonadjudicatory hearings indicating that steam removal in The Geysers area has virtually no impact on seismicity and that the low reinjection water pressures likewise pose no threat to ground stability. This is primarily due to the extremely hard rock formations in the area which are characteristic of a dry steam field.

PROPOSED FINDINGS

GEOLOGY AND SEISMICITY

1. Known major faults zones potentially affecting the project site include the Hayward, Calaveras, Concord, Green Valley, Rodgers Creek, Maacama, Cobb Valley-Callayomi, and Konocti Bay fault.

2. An active fault, as defined by the State Mining and Geology Board, is one "which has had surface displacement within Holocene Time (approximately the last 11,000 years)." The Energy Commission staff accepts the validity of the above definition.

3. Recent evidence (USGS Open File Report, 78-597), has indicated that strike - slip fault creep may have occurred along the Callayomi fault zone, indicating its potential for seismic activity.

4. NCPA agrees to make site specific geotechnical evaluation and seismic analysis prior to final selection of the plant site. This evaluation and analysis will provide the basis for design criteria and construction procedures to eliminate or reduce identified geologic hazards and impacts, and will consider the possibility of ground surface rupture on the Callayomi fault.

5. The proposed power plant site no. 3 will be developed adjacent to well pad "A" and will use the same access road. The flat plant site will be established by reduction of existing terrain to the same basic elevation as the drill pad. All major structures of the plant will be located on the exposed base rock, assuring integrity of foundations. Engineered fill will be required only at the periphery of the plant site.

6. Well pad "A" and plant site no. 3 are the most desirable sites from a geologic standpoint.

7. There is much uncertainty about the Callayomi fault, which runs through the project leasehold. The Applicant agrees that its potential

for activity must be considered in any seismic design analysis. Justification for seismic design will be provided in the Reliability section of the AFC.

8. In formulating seismic design criteria, it will be necessary for the Applicant to analyze all "active" and "potentially active" faults which may produce earthquakes of sufficient magnitude to have an effect upon the plant. The Applicant agrees to provide this analysis prior to or at the AFC filing.

9. No geologic conditions within the leasehold would appear to preclude the siting of a geothermal power plant, so long as the plant is not constructed across any of the potentially active branches of the Callayomi Fault Zone.

10. No adjudication of this issue is necessary in the NOI.

5. Soils

Staff and Applicant have identified a series of mitigation measures to protect and retain the thin top soil and disturbed cuts around the plant site. A series of revegetation steps will be taken by the Applicant along with the monitoring of siltation rates.

The Committee heard testimony from Lake County regarding some of the soil erosion problems at the site. The County recommended that revegetation measures be planned for the south facing slope which would be created by fill from the power plant site excavation. As a result the Committee directed the Applicant to include a revegetation plan for both the south and west plant site slopes as part of its AFC submittal.

PROPOSED FINDINGS

SOILS

1. The conversion of watershed lands to industrial use in the KGRA soils creates a significant potential for erosion and subsequent sedimentation.
2. Inadequate data exists on erosion rates or sediment yield for the KGRA.
3. NCPA agrees that design and construction for the sedimentation pond will comply with the regulations of the California State Department of Conservation Resources Agency, "Erosion and Sedimentation Control Handbook", Section 92.
4. NCPA agrees to implement the following mitigation measures to control soil loss and erosion:
 - a. The temporary and permanent measures outlined in the NOI at pages V-II5 through V-II8.
 - b. 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.
 - c. Quantification of the amount of sediment removed from the proposed sedimentation basin(s) and an annual report of this information to both CEC and the Central Valley Regional Water Quality Control Board (CVRWQCB).
5. The CEC soils staff, in consultation with the Central Valley Regional Water Quality Control Board agree that mitigation measures proposed by NCPA appear to be acceptable. However, no specific schedule or design for implementation has been designated. NCPA agrees to provide prior to or at the time of the AFC the specific designs and schedules for the implementation of the measures outlined in Finding 4 above. NCPA also agrees to submit at the time

of filing the AFC a plan for revegetating the slope created by cutting and filling at the power plant site.

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

6. Biological Resources

The Committee received testimony on the biological resources for the plant site and leasehold indicating that the information provided on this matter was adequate for the NOI proceeding. Staff noted its desire that further studies be done prior to filing the AFC. In response, the Committee directed the parties to establish a schedule for such studies to better assess the project's impact on wildlife and to plan for necessary mitigation of the impacts.

PROPOSED FINDINGS

BIOLOGICAL RESOURCES

1. A portion of the project leasehold has been designated as a botanically unique area by the California Natural Areas Coordinating Council (CNACC). This botanically unique area may contain the Lake County Dwarf flax (*Hesperolinon didymocarpum*), glandular dwarf flax (*Hesperolinon adenophyllum*), and white sedge (*Carex albinda bailey*). The Lake County dwarf flax is listed as endangered by the California Native Plant Society (CNPS), rare by California, and is proposed for listing as endangered by the federal government. The glandular dwarf flax is listed as rare by CNPS and is a candidate species for federal listing. The white sedge is listed as endangered by CNPS and is proposed for listing as endangered by the federal government.

2. In its AFC filing, NCPA agrees to include a detailed plan, including a wildlife management plan, of those measures necessary to mitigate biological impacts in the project area.

3. Prior to the filing of the AFC, NCPA agrees to identify on a map CNACC natural area no. 171210 and any anticipated project activities which will occur in that area.

4. The applicable legal standards in this area include:

a. California Fish and Game Code, sections 900-903, 2050-2055, 3511, 4700, 5000, 5050, 5515.

b. The Endangered Species Act of 1973, 16 U.S.C. sections 1531-1543.

5. The leasehold biological survey conducted by NCPA and other information submitted for the record is adequate to satisfy the requirements of the NOI.

6. NCPA and Staff agree to submit to the Committee by February 1 a joint agreement which will include what further biological studies need to be done before or at the time of the AFC.

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

7. Noise

Noise was cited by Lake County as one of its primary concerns when siting a geothermal power plant. The County applies a standard of 55 Ldn to geothermal plant output to nearby noise receptors. Staff concludes that the project as designed may not meet the noise standard. Therefore, in an effort to lessen the noise impact of the project, the Committee directed the Applicant to consider noise impacts when designing and submitting a vegetation plan for the AFC. Until specific plant design and plant noise levels information is available, a precise determination of conformance with County standards cannot be made. However, no information received by the Committee to date on the issue of noise would preclude the plant from going forward to the AFC stage.

PROPOSED FINDINGS

NOISE

1. Lake County has adopted a Noise Element to its General Plan, the intent of which is to limit plant operating noise levels at residential receptors to 55 dBA Ldn. Lake County currently establishes noise limits by placing conditions in use permits. NCPA agrees to comply with the Lake County Noise Element.

2. Lake County is presently considering a draft noise ordinance imposing a limit of 55 dBA for daytime hours and 45 dBA for nighttime hours.

3. The proposed project site is in close proximity to four residential receptors: the Robinson residence, Binkley ranch, Adams residence, and Huff residence; it is also in close proximity to a structure known as the "Nunnemaker property". An estimate of projected operational noise levels from site no. 3 to these receptors suggest the noise of operation of the plant should be audible at the Robinson residence, Binkley Ranch, and "Nunnemaker property".

4. Surveys in the vicinity of the proposed site indicate an ambient noise level range of 40-46 dBA (L_{50}). Ambient noise levels in the project study area range from 33-56 dBA (L_{50}).

5. NCPA agrees to provide accurate information on the location of sensitive receptors and on the expected or design noise emission level of the facility. NCPA further agrees to perform a 24 hour survey at the following residential receptors: the Robinson residence, Binkley Ranch, and "Nunnemaker property".

6. Occupational noise limits are established by CAL/OSHA (8 Cal. Admin. Code Article 105). NCPA agrees to comply with the CAL/OSHA requirements.

7. With reference to number 5, results of the surveys will be provided at the time of submittal of an AFC on the project and will show L_x , L_{eq} and L_{dn} noise levels and relevant weather conditions and instrumentation data, (where $x = 10, 50, \text{ and } 90$).

8. The federal occupational noise standards are set by the Occupational Safety and Health Act of 1970 and are basically the same as CAL/OSHA standards.

9. The loudest plant construction noises will be caused by large earth-moving equipment. The noise associated with this equipment will be discernible to the closest receptors. The activity will be temporary in nature and performed during daylight hours whenever possible.

10. NCPA will require its employees to comply with the requirements of CAL/OSHA for hearing conservation through engineering, administrative controls and/or the use of hearing protectors, wherever necessary.

11. NCPA shall apply to the facility such mitigation as necessary in order to comply with the Lake County Noise Element. NCPA shall consider the following mitigations or their equivalents as a minimum:

- a. Path treatment will be installed on the exterior surfaces of the steam jet ejectors and will consist of materials as effective as mineral wool and an impervious membrane (aluminum and/or lead jacket).
- b. Thermal (high density) insulation will be installed on the exterior surfaces of the steam turbine and will reduce the noise inside the turbine building.
- c. The turbine building walls and roof will be constructed to reduce noise propagating to the outside environment.
- d. An enclosed control room will be built on the turbine-generator floor inside the building.
- e. NCPA's present purchase specifications for NCPA 2 for mechanical equipment encourage manufacturers to supply equipment that produces

a sound level no greater than 80 dBA at three feet from the boundaries of the device.

f. Steam drain lines will be routed back into the condenser so that steam will not be discharged into the atmosphere during unit start-ups.

g. During unit outage conditions, steam will be routed through a rock muffler system.

12. The list of noise sources and levels associated with steam supply activities is set forth in the Environmental Impact Report for NCPA/RFL Cobb Valley Geothermal Project (September 1977) and in the NCPA Geothermal Project No. 1 NOI.

13. The projected noise levels for production well testing with portable test mufflers, steam transmission line start-up, unmuffled venting, and well head master valve changes will be significant noise sources and will be discernible to local receptors. However, these four events occur infrequently. The noises associated with the steam field drilling operations would be discernible to Lake County receptors.

14. The noise effects from the steam field development generally exceed plant construction and operation noise levels.

15. No adjudication of this issue is necessary in the NOI.

8. Cultural Resources

At the nonadjudicatory hearing Staff testified that more specific information on cultural resources would be needed from the Applicant by the filing of the AFC. One reason for the additional information is the evidence that a very high concentration of archaeological sites exists within the leasehold. These sites, or middens, must be identified and, if necessary, protected through fencing or other means. The Committee has requested and received from NCPA an outline of the objectives for the additional study work which will be carried out prior to filing the AFC.

PROPOSED FINDINGS

CULTURAL RESOURCES

1. Cultural Resources include paleontological, archeological, historical, ethnographical resources and resources of educational, scientific, religious and other significance.

2. The applicable standards include:

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

3. The project area cultural resources have not been fully evaluated. A cultural resources survey which will address and evaluate paleontological, historical, ethnographical resources and resources of educational, scientific, religious and other significance will be prepared and submitted by NCPA prior to or at the time of the filing of the AFC. The parameters of this cultural resources survey will first be approved by the CEC staff.

4. Preliminary studies indicate numerous archeological sites are found within the NCPA leasehold. None of the identified sites are in close proximity to the preferred plant site, and the proposed project could be constructed and operated without adversely affecting such cultural resources.

5. NCPA agrees to not disturb identified cultural resource areas during steamfield development or during construction of access roads. NCPA also agrees to seek the cooperation of RFL to avoid disturbing cultural resource areas during steamfield exploration and construction.

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

9. Socioeconomics

Social and economic issues in this proceeding have been of great concern to the Committee largely because of the potential impacts on Lake County. The County too, has shown concern by intervening in these proceedings and, more recently, filing a motion to consolidate the Notice of Intention proceedings in this case with the Application for Certification proceedings in the DWR Bottle Rock case.

Socioeconomic issues of particular concern to Lake County include the following:

1. Bottle Rock Road--Due to the increased traffic from this project and others, the road will require a major upgrading at great expense.
2. Land Use--The Cobb Valley area is primarily dedicated to residential and resort use and the location of geothermal power plants may not be compatible with such uses.
3. Housing and Schools--The County is concerned that the influx of construction workers needed to build the plant will overload existing housing and educational facilities.
4. Taxes--As a result of State Propositions 13 and 4 the County feels that the NCPA 1 Project may not provide sufficient revenues to offset costs.

The Committee has received written information and oral testimony from all of the parties on these matters and has made a particular effort to gain the views of Lake County. Testimony on these issues was

given by County representatives at the nonadjudicatory hearings and the County was asked to submit supplementary information to the Committee. Such has been received into evidence.

It is the intention of the Committee not to prejudice the rights of any of the parties to this proceeding. The full Energy Commission will consider Lake County's Motion to Consolidate regarding air quality and socioeconomic issues on January 16, 1980. Until the motion has been acted upon by the Commission, this Committee will reserve its decision regarding whether matters concerning air quality and socioeconomics must be adjudicated in this case.

PROPOSED FINDINGS

SOCIO-ECONOMICS

1. The project will employ approximately 120 workers during the peak construction period; 80 of these workers will be employed for plant construction and 40 workers will be employed in steamfield development.

2. Following its construction the plant will be operated by an estimated work force of 8 persons.

3. NCPA's scheduled labor requirements will occur during 1981 and 1982, overlapping with the scheduled construction employment needs of DWR/Bottle Rock, NCPA 2, PG&E Units 16, 17 and 18, and SMUD Unit 1. The Staff estimates that construction of the above plants will result in approximately 110 new residents moving to Lake County, including approximately 40 children.

4. Lake County has expressed concern that further population increases will adversely affect educational facilities and the supply of housing in the area.

5. There are four school districts in Southwestern Lake County, two of which (Konocti and Lakeport) presently exceed their enrollment capacities. Planned geothermal development will not significantly increase enrollments in these school districts.

6. Motel rooms and "housekeeping" units may provide a short-term housing resource for geothermal workers. Although housing availability has not yet been inventoried, the number of workers involved in geothermal plant construction is not expected to seriously impact housing resources.

7. At the filing of the AFC, NCPA agrees to provide information on the potential cumulative growth and development impacts on southwestern Lake County resulting from geothermal development. This information shall include a discussion of impacts on housing supply and educational facilities,

and how such impacts might be mitigated. NCPA agrees to collect this material after consulting with the Energy Commission staff.

8. The Applicant has formed a non-profit subsidiary corporation known as the North California Municipal Power Corporation (NCMPC). NCPA has signed an agreement that NCMPC will own and operate the NCPA 1 power plant and will pay property taxes "in the same manner and to the same extent. . . as other privately owned property in the county".

9. The Lake County Tax Assessors Office has estimated the property tax revenues for the completed NCPA 1 power plant and steamfield project at approximately \$964,000 annually. Tax revenues will begin to accrue during the construction period, and will increase annually as the facilities are completed.

10. The direct and indirect costs to Lake County from regulatory and administrative functions and from the provision of public services will be small in relation to the capital investment of the project. However, as a result of new state tax laws, its is presently unclear whether these costs to Lake County will be offset by property tax revenues generated by the project.

11. With the exception of the Scenic Highway Element of the Lake County General Plan, the proposed project appears to be compatible with the Lake County General Plan, and Lake County Zoning Code, and Lake County's Conditions, Procedures, and Performance Standards for Geothermal Regulation.

12. The scenic highway element of the Lake County General Plan designates certain routes as "scenic corridors". Views from the scenic route within such scenic corridors are to be preserved through the application of "development controls". Bottle Rock Road is one such scenic route.

13. Because of its relatively high elevation, the preferred project site may be visible from Bottle Rock Road. The site is also clearly visible to residents living west of the site. At the filing of the AFC,

NCPA agrees to provide information on methods for mitigating visual impacts resulting from the project, and on whether such mitigation measures would result in compliance with the Lake County Scenic Element.

14. Bottle Rock Road is the primary access road for the NCPA 1 and DWR Bottle Rock projects. Lake County is presently contemplating a road reconstruction project to make Bottle Rock Road suitable for heavy vehicle use. Although a final plan allocating costs among the users has not been determined, NCPA anticipates that any portion of the resultant expenses allocated to its project would be derived from its tax payments to the county.

15. Recreational activities within the leasehold area include hunting, fishing, and hiking on private lands by owners and guests. Camp Beaverbrook is a privately-owned summer camp for children, located just outside the leasehold boundary. At the filing of the AFC, NCPA agrees to indicate how impacts on nearby recreational uses can be mitigated.

C. Other Related Issues

1. Need for the Project

The Applicant testified on the record that it is an agency made up of municipalities to which it provides power. The electrical needs of these members have grown rapidly from a demand of 397 megawatts in 1968 to 644 megawatts in 1985. The agency presently has no generating capacity and must buy all of its power from either PG&E or the Western Area Power Administration (WAPA). The price of this power is rapidly becoming both more expensive and less available. Due to these factors, the Applicant feels that even the relatively small capacity of the proposed geothermal project will result in considerable savings to NCPA members.

The staff testimony at the nonadjudicatory hearing indicates that while on the basis of capacity alone this plant will only be needed for the single year of 1982, other factors must be considered. There is considerable uncertainty in PG&E system resources such as the Diablo Canyon nuclear plant and the fact that 42 percent of the PG&E system is oil based. Even assuming the continued availability of oil, petroleum prices are rapidly escalating. In addition, national policy and federal law favors the displacement of oil fired power plants. The proposed project would displace approximately 800,000 barrels of oil each year. Furthermore, geothermal power offers increased flexibility in the statewide power supply system and has proven to be 80 percent reliable.

PROPOSED FINDINGS

NEED FOR THE PROJECT

1. It is the policy of the California Energy Commission to encourage the accelerated development of geothermal energy.
2. NCPA is an independent municipal agency formed to purchase, generate, distribute and sell 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 1 will begin full commercial operation in December, 1983.
5. NCPA 1 will generate baseload electricity and have a net generating capacity of 63.4 MW.
6. The area served by NCPA is within PG&E's service area.
7. There is a need for the proposed facility for the following reasons:
 - a. The NCPA project would save approximately 800,000 barrels of oil per year by displacing less efficient oil units in PG&E's system.
 - b. The project has the advantage of relatively short construction time, and would give NCPA greater flexibility in meeting peak load demands.
8. No adjudication of this issue is necessary in the NOI.

2. Financial Impacts

To date, the record has not been fully developed regarding the financing of this project. All capital costs, construction and operating expenses will be borne by the Applicant. At this date the total estimated cost of the project is approximately \$45 million to construct the plant. This figure is based on January 1979 costs adjusted forward at 8 percent per year. Estimated annual operating costs are \$13,890,000. NCPA estimates no increase in rates to its members' end-users as a result of this project.

The subject of financial and economic feasibility will be further explored in a hearing on the subject scheduled for January 31, 1980.

3. Public Health

The effects of this project on public health are likely to be very similar to the effects of other geothermal projects. The primary concern with such projects is the amount of H_2S emissions. Standards in Lake County and elsewhere for the release of H_2S are based on the nuisance level of 30 parts per million. The level at which health may be endangered is 10 or 20 parts per million. Other chemicals likely to be released in small quantities include arsenic, mercury, and ammonia. These should be in such small amounts as to present no risk to public health.

Camp Beaverbrook raised questions at the nonadjudicatory hearings about the effect of H_2S on active young children. The Staff witness testified that some studies indicate higher susceptibility among the young, the more active and the fragile. However, the witness stressed that this information was developed during much higher exposures than are likely to be experienced at a controlled geothermal power plant.

The Staff testified that, particularly in light of the lack of steam analysis, a detailed evaluation of the project's public health impacts would have to await the AFC filing.

PROPOSED FINDINGS

PUBLIC HEALTH

1. The public health issues which arise from geothermal development are generic in nature. The potential public health impacts of NCPA 1 are essentially similar to those of previous geothermal developments.

2. Generic information concerning the regulated and nonregulated pollutants from a geothermal power plant in the Geysers KGRA which are applicable to the NCPA 1 NOI include:

Hydrogen Sulfide

- a. 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. Emissions may also occur during well bleeding or venting during well development and maintenance activities.
- b. The available existing data on health effects is insufficient to permit experts to reach a uniformly accepted position regarding the human health effects of chronic low level exposure to H_2S .
- c. The state ambient air quality standard for H_2S is 0.030 ppm (1 hour average).
- d. The state ambient air quality standard for H_2S is based on nuisance odor.
- e. Hydrogen sulfide has an odor which can be detected at concentrations of less than 0.030 ppm.
- f. The Illinois Institute for Environmental Quality suggested ambient air quality standard for H_2S , which is intended to protect public health, is 0.01 ppm (8 hour average).
- g. Ambient H_2S concentrations in the project area have exceeded the state standard of 0.03 ppm.

Ammonia

- a. NCPA Geothermal Project No. 1 will emit ammonia in the cooling tower exhaust drift during normal operation and in the steam supply during periods of steam stacking.
- b. Inhalation of ammonia in sufficient quantities can cause adverse health effects.
- c. 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)
- d. Ammonia concentrations in steam from 61 producing wells at The Geysers has averaged 0.0194 percent by weight.
- e. Atmospheric reactions of ammonia emissions could potentially form toxic ammonium compounds, such as ammonium sulfate.
- f. Sulfates can form through atmospheric oxidation of H_2S .
- g. Sulfates can be toxic to humans when inhaled in sufficient quantities.
- h. The California ambient air quality standard for suspended sulfates is 25 ug/m^3 (24 hour average).
- i. Ambient temperatures and concentrations of precursors at The Geysers do permit the formation of ammonium bisulfide in quantities that could cause health effects.

Arsenic

- a. NCPA Geothermal Project No. 1 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.

- b. All forms of arsenic are known to be toxic at some concentration, and some forms are potentially carcinogenic.
- c. An EPA sponsored expert panel 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.
- d. 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).

Mercury

- a. 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.
- b. Mercury is toxic to humans when inhaled or ingested in sufficient quantities.
- c. There is no adopted ambient air quality standard for mercury, although an EPA sponsored expert panel 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 to 0.01 ug/m^3 to protect against potential carcinogenic effects. (EPA-600/7-77-136a). In addition, an ambient target level of 1.0 ug/m^3 (30 day average) has been suggested pursuant to the Clean Air Act of 1970 as a basis for a National Emissions Standard for Hazardous Air Pollutants.
- d. Mercury can enter the food chain from contaminated air, soil and water.
- e. Mercury in the food chain can adversely impact public health if present in sufficient quantities.

Radionuclides

- a. The noncondensable gas fraction of geothermal steam originating from natural fumarols and developed wells contains the noble radioactive gas, radon-222 (^{222}Rn).
- b. Radium-226 is a parent radionuclide of ^{222}Rn and occurs naturally in the soil in varying concentrations at The Geysers.
- c. Inhalation of short-lived daughter products of ^{222}Rn can cause adverse health effects.
- d. The maximum rate of release of ^{222}Rn in emissions from the 11 operating power plants at The Geysers has been measured at approximately 1.43 Ci/day.
- e. 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.
- f. 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.
- g. The California standards for ^{222}Rn are 100 pCi/l in air for a controlled area and 3 pCi/l in air, above natural background, at the point of release to the environment in uncontrolled area.
- h. The radionuclide ^{210}Pb will be contained in the cooling tower sludge from the NCPA power plant.
- i. The resulting ^{210}Pb will result from air scrubbing.
- j. Cooling towers at power plant types other than geothermal power plants have shown the same tendency to scrub ^{210}Pb from ambient air.

Sulfur Dioxide

a. Atmospheric oxidation of H_2S may form small amounts of sulfur dioxide (SO_2).

b. The California Air Resources Board has established a 24 hour ambient air quality standard 0.05 ppm in the presence of oxidant or particulate standard exceedance.

3. There is evidence that children may be more susceptible than adults to the effects of acute hydrogen sulfide pollution.

4. The health effects on children of chronic low-level hydrogen sulfide pollution have not been well-documented.

5. There is evidence of adverse health effects among children exposed to ambient hydrogen sulfide concentrations of 30 parts per billion or less.

6. No adjudication of this issue is necessary for the NOI.

4. Safety and Reliability

To further carry out the provisions of Public Resources Code Section 25511 which requires the Commission to "determine the adequacy of measures proposed by the Applicant to protect public health and safety", Section 25512 requires the Committee to include Findings in the Summary and Hearing Order regarding factors related to the "safety and reliability" of the facilities at the site. Among these factors are "social design features to account for seismic and other potential hazards". "Reliability" is also 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 engineering and transmission line in the following proposed Findings.

PROPOSED FINDINGS

SAFETY AND RELIABILITY

1. At the filing of the AFC, NCPA agrees to:
 - a. Explain the selection of materials used for hydrogen peroxide storage tanks.
 - b. Provide design codes and seismic design criteria for all storage tanks for toxic, flammable, or otherwise hazardous materials.
 - c. Provide an evaluation of and need for off-site fire protection assistance.
 - d. Enumerate NFPA codes which apply to the on-site fire protection system.
 - e. Detail the worker safety/accident prevention program proposed for the facility.
2. The applicable standards in this area include:
 - a. Handling and storage of hazardous, toxic, and flammable materials:
 - Hydrogen - 49 CFR §173.302, 178.36, 178.37
 - Acetylene - 49 CFR, §173.303, 178.36, 178.37
 - Sodium Hydroxide - 49 CFR, §173.245(b), 8 CAC Chapter 47
 - Oxygen - 49 CFR, §173.302, 178.36, 178.37
 - Paint Thinner - 49 CFR, §173.128
 - Pressure Vessels - ASME Code Section VIII, Div. I, 8 CAC §4.1
 - Storage Tanks - API 650, Manufacturing Chemists Association
Chemical Data Sheets SD-53
 - H₂O₂ - 8 CAC Chapter 4.7, group 16

b. Fire Protection:

Federal Occupational Safety and Health Act of 1970

Public Resources Code section 4291

Title 8, CAC Chapter 4.7, Groups 20, 27

c. Worker Safety Program:

Federal Occupational Safety and Health Act of 1970

Title 8, CAC Chapter 4

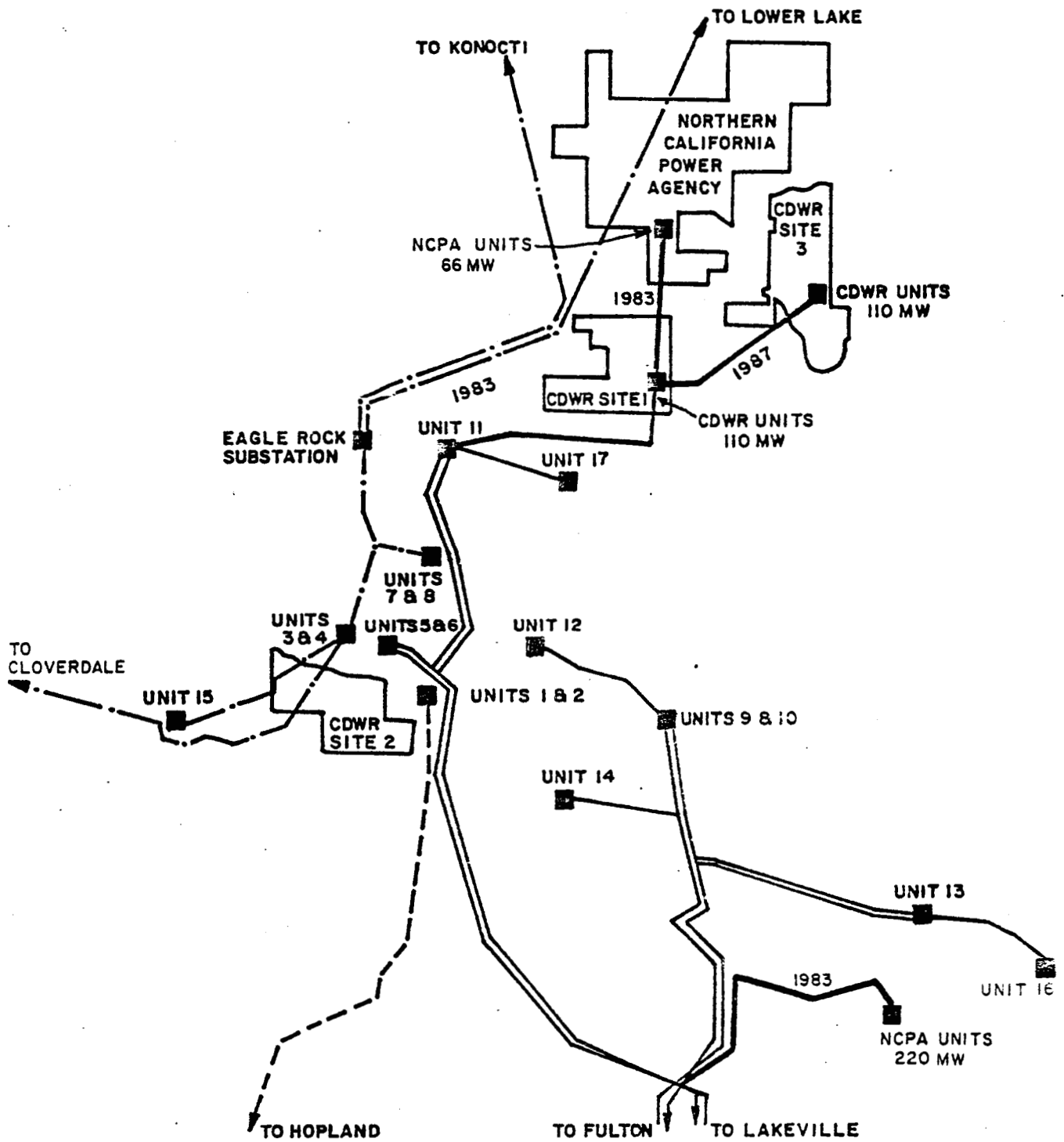
3. At this time, it appears that any hazardous or toxic materials which are presently used or proposed for use in geothermal power plants can be transported, stored, and handled in a safe manner and in compliance with the aforementioned standards. If NCPA submits the information required by CEC regulations and stipulated to in these facts, Staff will be able to verify compliance during the AFC.

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

5. Transmission Lines

At the nonadjudicatory hearings the Committee received testimony from the Staff indicating that, in Staff's view, the Applicant's tap-line transmission plan did not preclude siting the plant. However, Staff noted that the present plan for transmission lines in the Cobb Valley area will result in greater transmission losses of power, greater cost and reduced reliability compared to several feasible alternatives. In addition, the Committee notes that the success of any transmission tap-line route will depend on NCPA reaching a power wheeling agreement with the California Department of Water Resources and Pacific Gas and Electric Company.

The Staff strongly recommended that due to the planned development of new geothermal plants in The Geysers area, a comprehensive study be made of the most efficient, reliable, inexpensive, and least environmentally damaging routes for transmission lines serving the various plants.



LEGEND

	230 KV
	115 KV
	60 KV
	230 KV CDWR/NCPA LINES

GEYSERS UNITS AND ASSOCIATED TRANSMISSION LINES

**(UPDATE PG & E 230 KV SYSTEM IN GEYSER AREA
TO CARRY ADDITIONAL CDWR/NCPA GENERATION)**

PROPOSED FINDINGS

TRANSMISSION ENGINEERING

1. One of the options considered by NCPA is to construct a 1.5 mile 230 kV transmission line from the proposed site to the Department of Water Resources (DWR) Bottle Rock transmission line. The power would then join the Bottle Rock generation and flow first to PG&E Unit 17, then to Unit 11, and then be carried out of the Geysers area.

2. As an alternative NCPA also considered in the NOI interconnecting directly to Unit 11. In addition, NCPA has subsequently identified (but not evaluated) two additional interconnection points: Units 17 and the existing PG&E 115 kV line from Eagle Rock Substation to Lower Lake.

3. The proposed NCPA 1 power plant is 66 MW and NCPA anticipates that this same geothermal lease may also support an additional 100 MW of power, so that the proposed transmission line could be expected to carry a total of 166 MW by 1987.

4. The proposed DWR Bottle Rock power plant is 55 MW and DWR anticipates a 110 MW DWR #3 power plant in this same area; so that DWR generation on the Bottle Rock transmission line could be 165 MW by 1987.

5. PG&E Unit 17 power plant is approximately 110 MW.

6. The approximate capacities of the proposed NCPA 1 transmission line, the proposed Bottle Rock transmission line, and the Unit 17 transmission line are 300 MW each (based on 317 MVA and 0.95 power factor).

7. If NCPA 1 is interconnected with the Bottle Rock transmission lines as proposed and the total generation identified in facts 3 and 4 is realized, then the Bottle Rock transmission line with its capacity of 300 MW would not be able to accommodate the potential lack of 331 MW (166 MW for NCPA and 165 MW for DWR).

8. The transmission line from Unit 17 to Unit 11 has a 300 MW capacity. Proposed NCPA 1 (66 MW), future NCPA (100 MW), DWR 3 (110 MW), DWR Bottle Rock (55 MW), and the existing PG&E Unit 17 (110 MW) will generate a total load of 441 MW. Accordingly, the transmission line from Unit 17 to Unit 11 would be unable to accommodate the potential total load of planned geothermal development.

9. The R.W. Beck report, dated February 1979, does not adequately address coordinated regional transmission line planning.

10. NCPA is willing to participate in any future staff or committee sponsored workshops to consider a joint transmission study by DWR, PG&E and NCPA. Such workshop(s) will consider capacity, cost, transmission losses, reliability, and plans to accommodate future geothermal development.

11. Prior to or at the time of filing of the AFC, NCPA agrees to identify a preferred interconnection point.

12. At the filing of the AFC, NCPA agrees to provide a study justifying conductor size, number of circuits, and the preferred interconnection point. The study shall consider the adequacy of capacity, cost, transmission losses, and reliability. The study shall provide adequate data to allow replication of the values obtained. All estimating values and their sources shall be included.

13. PG&E and the Applicant are presently negotiating a 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 finished. 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. The status report shall specify the area in which agreement has been reached and shall identify those areas in which issues are unresolved.

14. The information received by the Committee regarding transmission lines does not preclude a reasonable likelihood that the project may be sited.

15. No adjudication of this issue is necessary for the NOI.

6. Civil and Structural Engineering

The Applicant has stated that it intends to establish specific design criteria at the time geotechnical design work is done for the project. The criteria will essentially be the same as that used in designing the proposed NCPA Geothermal Project No. 2.

PROPOSED FINDINGS

CIVIL AND STRUCTURAL ENGINEERING

1. NCPA agrees to comply with Lake County Ordinance 970, which adopts Chapter 70 of the 1976 UBC (Grading and Excavation). NCPA further agrees to address, in detail, compliance with the UBC and all other applicable standards in the AFC.
2. There do not appear to be any conditions at the site which, from an engineering standpoint, cannot be managed with the use of good engineering practice.
3. The Applicant's proposed structural design criteria (other than seismic) are adequate for the purposes of this NOI.
4. No determination can be made as to the adequacy of the Applicant's proposed seismic performance criteria. This determination can be made only when NCPA provides the information required in the section on Reliability.
5. No determination can be made as to whether the proposed seismic design criteria are adequate to ensure that the approved seismic performance criteria will be achieved. However, the seismic design criteria will be the same used in NCPA 2 AFC and should be adequate if modified for any site specific geologic and soil conditions.
6. No determination can be made as to the compliance of the facility's structural design with applicable laws, ordinances, regulations, and standards. This determination can only be made after review of the final structural plans, specifications, and design calculations.
7. The Committee finds that the civil and structural engineering plans for the project to date do not preclude a reasonable likelihood that this project may be sited.
8. No adjudication of this issue is necessary for the NOI.

III. Hearing Order and Notice

A. Order

The Committee finds that subject to the requirements noted in the Proposed Findings contained in this Summary and Hearing Order, all matters necessary for a decision on the notice for NCPA 1 may be addressed within these NOI proceedings. However, noted among the Committee's Proposed Findings are a number of requirements for additional information which must be submitted at the time the Applicant files its Application for Certification.

The Committee further finds that there is no need for further adjudication of issues related to the following subject areas: hydrology and water resources, water quality, geology and seismicity, soils, biological resources, noise, cultural resources, need for the project, public health, safety and reliability, transmission lines, civil engineering and structural engineering.

The Applicant, Staff and Lake County have provided the Committee with a great deal of information regarding the impacts which this project may have on both the air quality and the social and economic fabric of Lake County and specifically the Cobb Valley area. Lake County has petitioned the California Energy Commission to consolidate this proceeding with that of the AFC for DWR Bottle Rock on matters related to air quality and socioeconomics. Argument by parties on the motion will be heard before the full Commission on January 16, 1980, as previously noticed.

In an effort to avoid prejudicing the interests of any party to these proceedings, the Committee will defer a decision on the further adjudication of issues relating to air quality and socioeconomics until the full Commission has ruled on Lake County's motion to consolidate.

If following the Commission hearing on Lake County's motion, the Committee for NCPA 1 determines that further adjudication of air quality and socio-economic matters will be necessary, adjudicatory hearings will be noticed for January 30th and/or 31st of 1980.

B. Notice

NOTICE IS HEREBY GIVEN that the Committee of the California Energy Commission for Northern California Power Agency Geothermal Project No. 1 will conduct a Public Conference to consider amendments to the attached Summary and Hearing Order. The Public Conference will be held at the following time and location:

Thursday, January 10, 1980

10:00 a.m.

California Energy Commission

1111 Howe Avenue, Room 620

Sacramento, CA 95825

The Public Conference is intended to give all parties, as well as the public, an opportunity to respond to or comment upon the Summary and Hearing Order. The Committee's Final Report will draw heavily upon this document. Therefore, the parties should carefully review the Summary and Hearing Order.

Interested groups and individuals are encouraged to attend this conference. Questions regarding the conference or other matters which are part of this proceeding should be directed to the Commission's Public Adviser's Office. Dan Parker of that office can be reached at (916) 920-6906 or toll free at (800) 852-7516.

APPENDIX A

STATE OF CALIFORNIA

State Energy Resources
Conservation and Development Commission

In the Matter of:

Notice of Intention of
NORTHERN CALIFORNIA POWER
AGENCY'S Geothermal Project
No. 1

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) DOCKET NO. 79-NOI-1
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)

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