800-78-000

CALIFORNIA ENERGY COMMISSION

FINAL REPORT

ON THE

PACIFIC GAS & ELECTRIC COMPANY'S

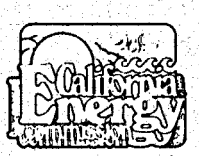
NOTICE OF INTENTION

TO SEEK CERTIFICATION FOR

GEYSERS UNIT 17

78-NOI-3

MASTER



DEC 1978

DISCLAIMER

STATE OF CALIFORNIA—THE RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION
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December 6, 1978

The California Energy Resources Conservation and Development Commission, through the Commission Committee assigned to the Pacific Gas and Electric Company's Notice of Intention for Certification of the Geysers Unit 17 (78-NOI-3), hereby publishes its Final Report pursuant to Public Resources Code section 25514.

C. SUZANNE REED, Commissioner
and Presiding Member of the
Committee

ALAN PASTERNAK, Commissioner
and Member of the Committee

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I. INTRODUCTION

A. The Final Report

1. Contents

This Final Report on the Geysers Unit 17 geothermal power plant proposal has been prepared pursuant to California Public Resources Code section 25514, and 25540. 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. In addition, the 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 agecny and public comments on the Preliminary Report (Appendices C and D). Finally, the Report presents the Committee's view of those issues that require further consideration in future proceedings in the Application for Certification (Section V) should the Commission approve the Notice as recommended by the Committee. Pursuant to Public Resources Code sections 25514 and 25540 the 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

This Report follows written and oral comments by parties on the Preliminary Report which was 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 the proceedings

included position papers prepared by the Commission staff on various issues, and Statements of Findings and Conclusions that various parties jointly or individually proposed to the Committee for adoption and incorporation in the Preliminary Report. The Committee had given all parties to the proceeding an opportunity to question or object to all findings and conclusions proposed for adoption in these Statements. 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.

During hearings on the Preliminary Report, no party nor member of the public suggested that evidentiary hearings were necessary to address any issue stated in the Preliminary Report. Nor 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. Thus, this Final Report restates and, where the Committee deems appropriate, amends the findings and conclusions of the Preliminary Report.

3. Opportunity for Response

The Commission will hold a public hearing on the Final Report, on December 20, 1978. In that hearing, any party may testify or make statements of position on the findings and conclusions set forth in this Report. In addition, any interested person will be given an opportunity to comment on the Report.

As the following indicates, the Committee is recommending that the Commission approve the Notice subject to conditions in the Proposed Decision. Consideration of the Proposed Decision by the Commission will concur concurrently with the Final Report hearing. Any party or interested person will be given an opportunity to comment on the Proposed Decision. The Proposed Decision, with amendments, if any, will be presented for a vote by the Commission. If the Notice is approved, PG&E will file an Application for Certification of Geysers Unit 17. Following further proceedings on the Application, the Commission will act to grant or deny certification. Such action could occur as early as early spring of 1979.

B. Description of the Proposed Geysers Unit 17 Project

1. The Facility

The Geysers Unit 17 which PG&E proposes to construct in Sonoma County is a dry steam geothermal power plant with a net normal operating capacity of approximately 110 MW. It is scheduled for commercial operation in 1982. The major structures of the proposed facility are a turbine building, cooling tower, electrical switchyard, and a hydrogen sulfide abatement facility. The turbine building would house the steam turbine generator and other associated equipment required for electrical power production. The mechanical draft cooling tower would dissipate heat from the power cycle. PG&E 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 13.8 kv to the 230 kv level required for economical power transmission. Six individual circuit lattice transmission towers would be constructed from the Unit 17 site to an existing transmission line near Unit 11. The 1.1 mile transmission corridor would occupy a total of 1.5 acres, would require 1,350 feet of spur roads to the tower sites, and would include three conduction stringing trails, three to five feet in width.

2. The Site

The site is situated on the divide of the Mayacamas Mountains in Sonoma County, about 1000 feet southwest of the Lake-Sonoma County line. It will occupy approximately seven acres, five of which are flat graded surface and two

of which are cut and fill slopes. A small ephemeral stream drains the valley north of the site and is a tributary to Squaw Creek which drains the valley south of the site. Vehicle access would be provided by constructing a road near the existing well pad east of the site.

3. The Steam Field

A large reservoir of geothermal steam exists in the Geysers Geothermal Area. This resource is presently being used to generate 502 MW of electric power at Geysers Unit 1-11. Units 12, 13, 14, and 15 representing another 400 MW are under construction; several other units in addition to Unit 17 are in the planning stage. Based on the production history of existing units, PG&E estimates that approximately 800 acres or slightly more than one square mile are required to support a 110 MW generating unit.

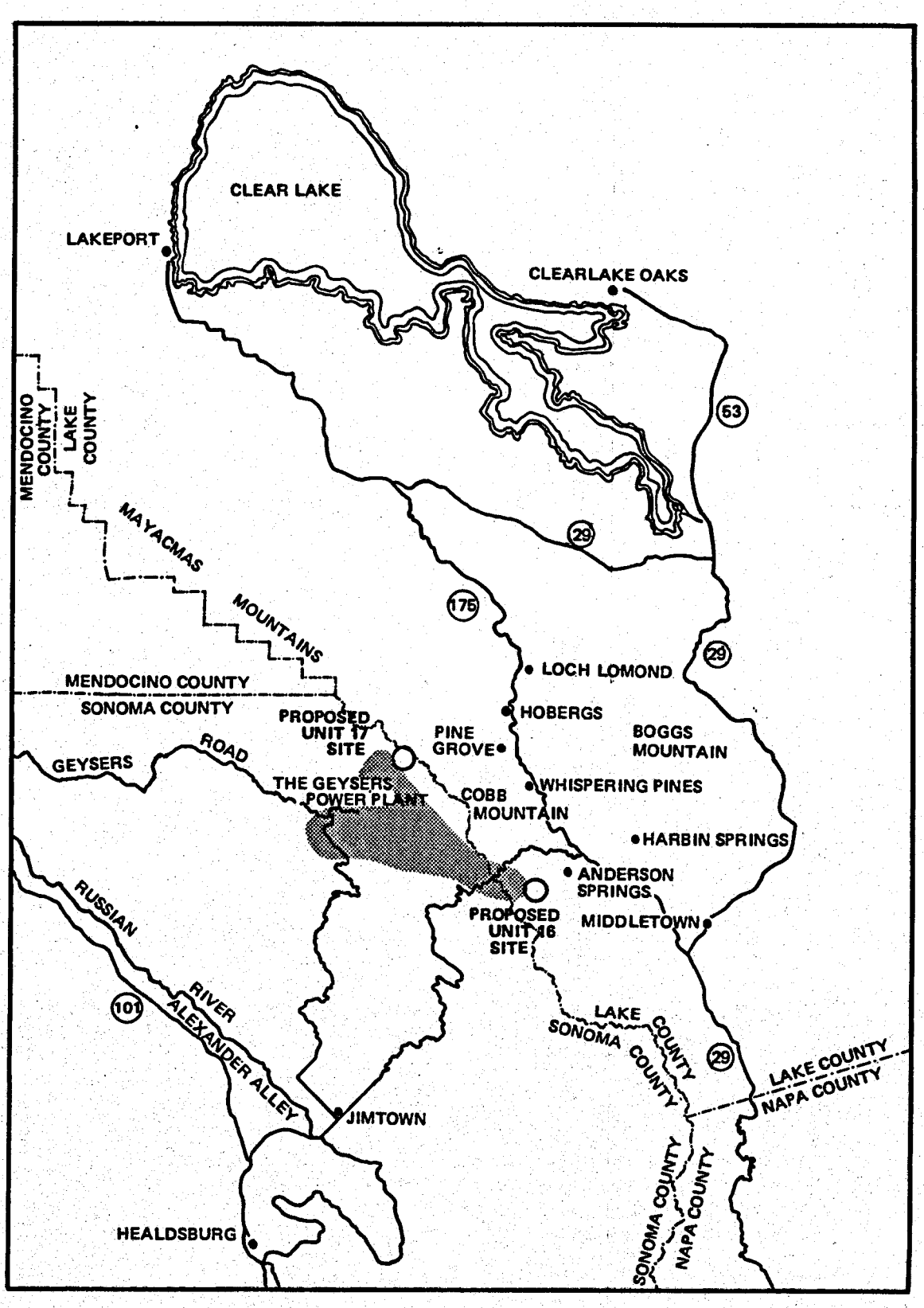
Three wells have been drilled within the Unit 17 steam supply field. Prior to completion of construction, additional wells would be drilled to provide the necessary steam supply. Union Oil, the producer who would be supplying the steam under contract to PG&E, estimates that 15 wells would be required initially. Thereafter, approximately 15 additional wells would be needed over the next 30 years to compensate for steamflow decline in the original producing wells. Approximately 60 percent of the steam field is located in Lake County and 40 percent in Sonoma County.

4. Authorization Required

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

	Permit Authority	Permit	Project Component
1.	Energy Resources Conservation and Development Commission	Certification to Construct and Operate	Power Plant and Transmission Line
2.	Northern Sonoma Air Pollution Control District	Authority to Construct and Permit to Operate	Power Plant and Portion of Steam Field in Sonoma County
3.	Lake County Air Pollution Control District	Authority to Construct and Permit to Operate	Portion of Steam Field in Lake County
4.	California Public Utilities Commission	Certificate of Public Convenience and Necessity	Power Plant and Transmission Line
5.	U.S. Environmental Protection Agency (EPA)	Prevention of Significant* Deterioration (PSD)	Power Plant and Steam Field
6.	Lake County Board of Supervisors	Conditional Use Permit	Portion of Steam Field in Lake County
7.	Sonoma County Board of Supervisors	Conditional Use Permit	Portion of Steam Field in Sonoma County

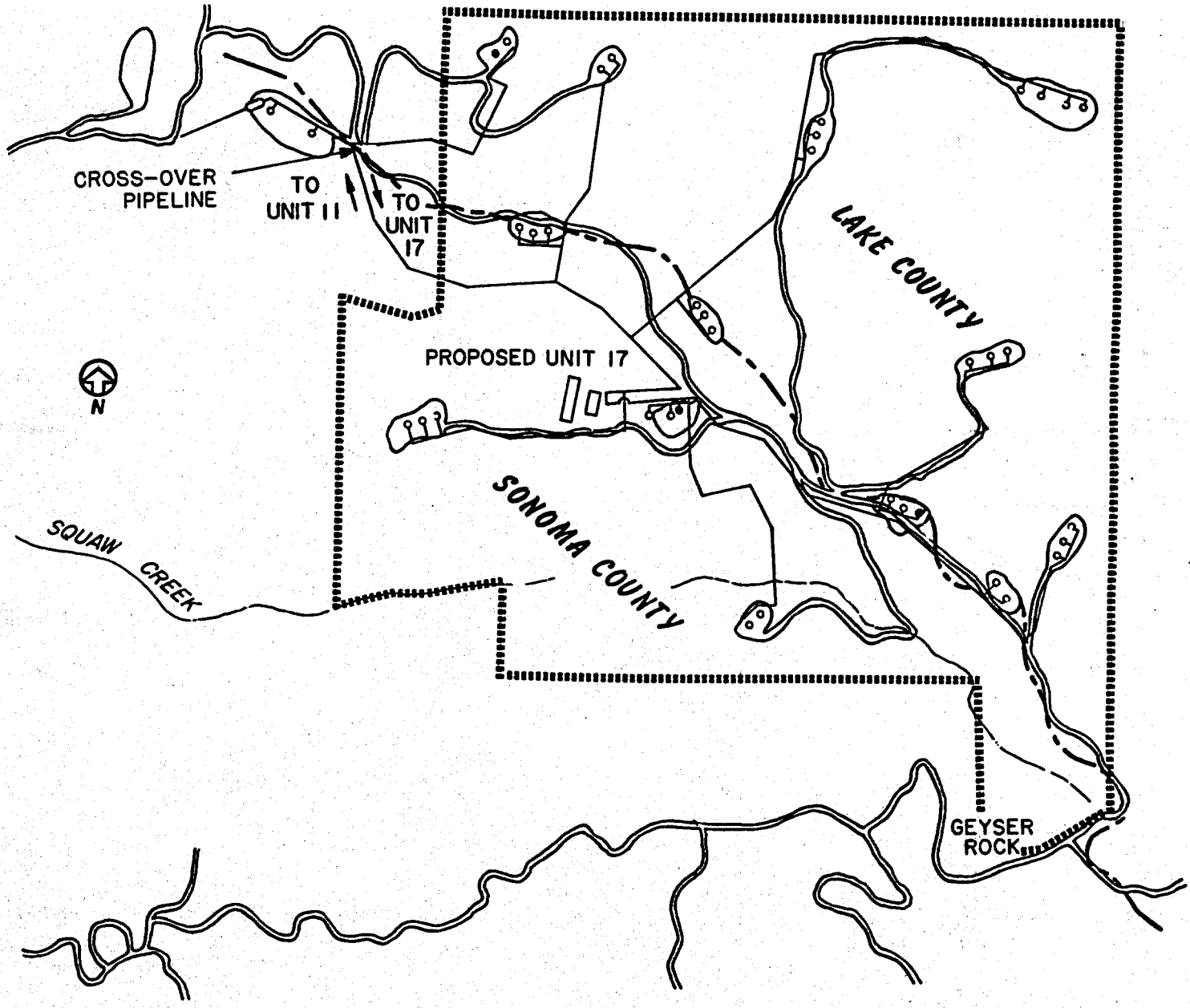
*It is not yet certain whether PSD rules apply to the proposed project, however, the Committee is awaiting confirmation from EPA on this point.



REGIONAL MAP

Original source: Geysers Unit 17 Notice of Intention

FIGURE 1



LEGEND

▪▪▪▪▪▪▪▪▪▪ UNIT 17 STEAM SUPPLY FIELD

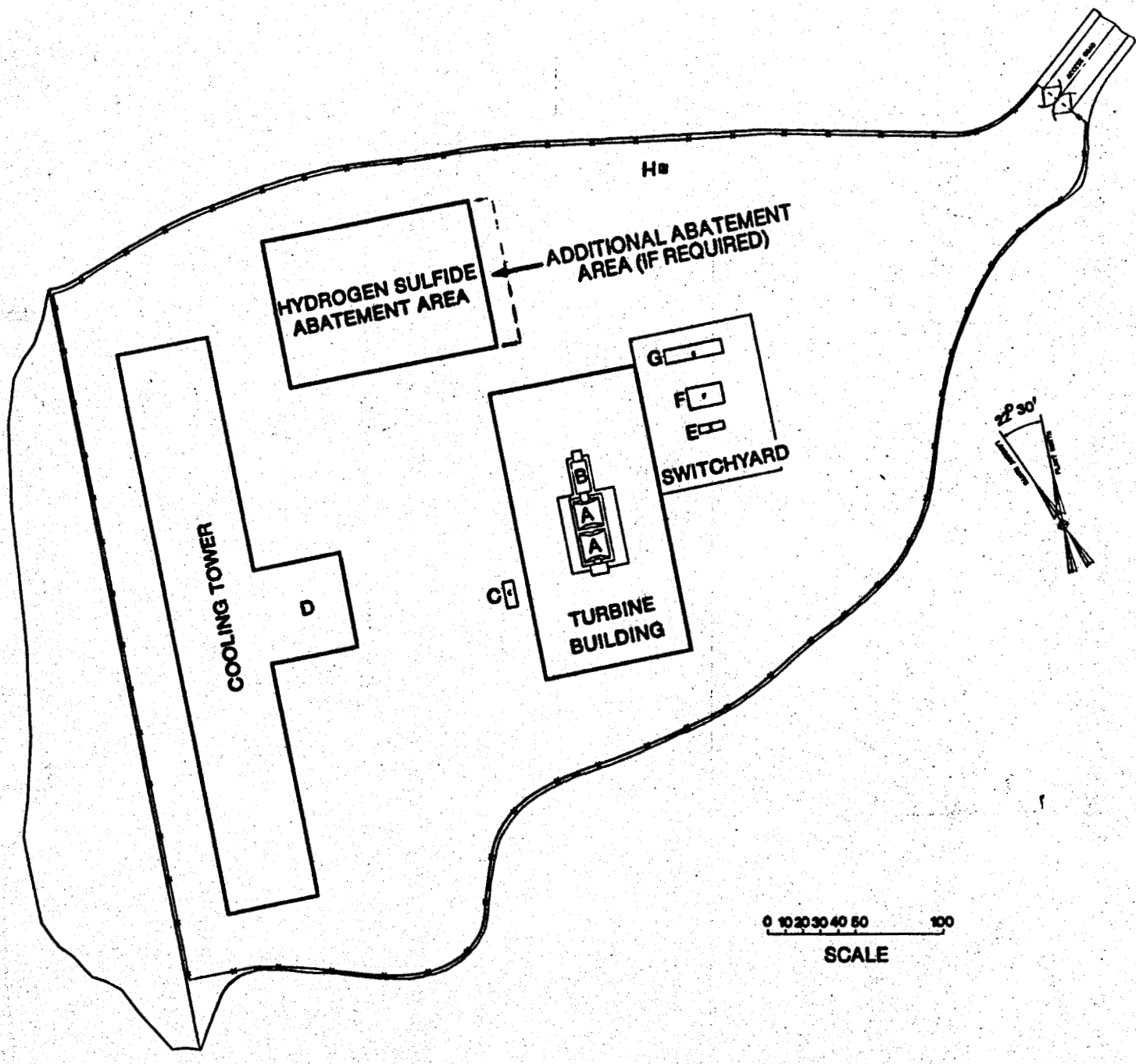
• EXISTING WELL

o PROPOSED WELL

EXISTING WELLS AND PROPOSED DEVELOPMENT WELL LOCATIONS FOR UNIT 17

Original source: Geysers Unit 17 Notice of Intention

FIGURE 2



LEGEND

A STEAM TURBINE
B GENERATOR
C GAS EJECTOR SYSTEM
D CIRCULATING WATER PUMP STRUCTURE
E GENERATOR BREAKER
F MAIN TRANSFORMER
G LINE BREAKER
H TRANSMISSION POLE

UNIT 17 PLOT PLAN

Original source: Geysers Unit 17 NOtice of Intention

FIGURE 3

C. Summary of the Proceedings to Date

1. Submittal of Notice of Intention

On May 25, 1978, the Pacific Gas and Electric Company (PG&E) filed with the Commission a Notice of Intention (Notice) to file an Application for Certification (Application) for Geysers Unit 17, proposed to be located in Sonoma County. On June 15, 1978, the Executive Director of the Commission accepted the Notice as containing adequate technical data and information required by Commission regulations to enable the Staff to begin analysis of the proposal. Subsequently, 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

In the course of the proceedings, the Committee granted the following parties leave to intervene: Oakmont Property Owners Association; City of Santa Rosa; County of Sonoma; Alpine Valley Property Owners Association; State Department of Water Resources (DWR); State Public Utilities Commission (PUC); County of Lake; Lake County Air Pollution Control District (LCAPCD); State Air Resources Board (ARB); Northern Sonoma County Air Pollution Control District (NSCAPCD) and Northern California Power Agency (NCPA). For more information on intervenors, please see Appendix B.

3. Issue Workshops

On July 6, 10, 13, and 14, in Kelseyville, Santa Rosa, and Lakeport, Commission staff held informal workshops to discuss issues and concerns related

to the project with PG&E and other interested parties. As a result of those workshops, staff prepared a series of position papers on the various issues and areas of concern, including: soils; hydrology; water quality; noise; socio/economic effects; biological resources; geotechnical issues; seismic performance criteria; seismic design methodology; need for capacity; comparative economics; and cultural resources. These subjects were addressed at Joint Prehearing Conference Statement Workshops on July 27 and 28 in Sacramento. The purposes of the workshops were for Commission staff and PG&E to attempt to prepare joint findings of fact and conclusions on issues that would need no adjudication or investigation in evidentiary hearings before the Committee, and to identify those areas of possible dispute where further information was required before the issue could be resolved. The workshops also provided other parties and the public an opportunity to propose findings and conclusions. Copies of the resulting Joint Prehearing Conference Statement of Findings and Conclusions were made available to the public on July 31, 1978.

Staff subsequently prepared and issued position papers on the issues of air quality and public health. Under a time extension granted by the Committee, the Commission staff, staff of the Air Resources Board, and PG&E on August 14, filed Joint Prehearing Conference Statements on air quality. The Commission staff and PG&E on August 18 filed separate Prehearing Conference Statements on public health.

4. Motion to Consolidate Proceedings

On July 18, the Committee held a hearing on the motion of the City of Santa Rosa to include PG&E's proposed Geysers-to-Lakeville transmission line in the proceedings on the Notice for Geysers Unit 17. The Committee ruled against PG&E's procedural motion to dismiss the City of Santa Rosa's motion

finding that consideration of the issue, even in the absence of the moving party*, was of sufficient importance to the proceeding for the Committee to hear it on its own motion. Representatives of the Oakmont Property Owners Association, the Alpine Valley Property Owners Association, and the County of Sonoma, all of whom supported the City of Santa Rosa's motion, made statements at the hearing. In addition, DWR expressed its concern that the transmission line issue be addressed as early as possible in the proceedings.

On July 19, the Committee issued an Order denying the motion of Santa Rosa, on the basis that PG&E would be filing the Notice for Geysers Unit 16 before the end of August 1978; that such filing would include a filing for the Geysers-to-Lakeville transmission line; and, thus, that all interested parties would be afforded the opportunity to review the transmission line proposal at that time. The Order also stated that, if that filing were for some reason delayed, any party, interested person, or the Committee could renew the motion of the City of Santa Rosa to consider the Geysers-to-Lakeville transmission line during the Geysers Unit 17 proceedings. [Note: The Notice for Geysers Unit 16, including the Geysers-to-Lakeville transmission line, was filed before the Commission on August 30, 1978.]

5. Informational Hearings

Pursuant to Public Resources Code Section 25509, the Committee conducted Informational Hearings on July 20 and 21 for the purpose of enabling Commission staff and PG&E to make presentations to all interested parties and members of the public concerning the proposed project and potential issues to be addressed during the proceedings. The hearings were held in Santa Rosa and Lakeport, respectively. During these hearings, the Committee afforded the public the

*Due to post-Proposition 13 constraints

opportunity to pose questions to the staff and PG&E and invited general comments and expressions of concern about the proposed project.

6. Prehearing Conferences

On August 10, the Committee held a Prehearing Conference in Santa Rosa, to consider the staff's and PG&E's Joint Statement of Findings and Conclusions on all issues except those of air quality and public health, and to identify issues of concern to other parties in the proceeding. Each proposed, agreed-upon finding and conclusion was discussed and the Committee gave each party the opportunity to state its intention to cross-examine witnesses for PG&E or the staff concerning any matter contained in the Joint Findings and Conclusions. In addition, the Committee provided each party the opportunity to state its intention to present a witness on any issue in subsequent evidentiary hearings. No party stated its intention either to present or to cross-examine witnesses during any proceedings prior to issuance of the Preliminary Report, nor did any party specifically object to any of the findings and conclusions proposed by staff and PG&E for adoption by the Committee. However, Lake County did raise some concerns with regard to socio/economic issues, and stated its intention to offer supplemental findings and conclusions on these matters in a subsequent Prehearing Conference.

On August 22, the Committee held a Prehearing Conference in Kelseyville to consider Joint and Separate Statements of Findings and Conclusions on air quality and public health issues. In addition, the Committee gave all parties the opportunity to reconsider issues discussed at the August 10th Prehearing Conference. PG&E, Commission staff, and ARB staff offered a Joint Statement of Findings and Conclusions on air quality issues; and Commission staff and PG&E offered Separate Statements of Findings and Conclusions on public health issues.

In addition, Lake County offered alternative findings and conclusions on socio/economic issues. The Lake County APCD and DWR offered and later withdrew, alternate findings and conclusions on air quality issues.

The Committee discussed each proposed Finding and Conclusion concerning air quality with parties and interested participants in the Conference. The parties conferred over language of the findings and conclusions and agreed to revisions so that no party, except for the Lake County APCD, specifically objected to any of the air quality findings proposed in the Joint Statement. In addition, no party requested to cross-examine witnesses for PG&E, the Commission staff, or the ARB staff, during any subsequent proceedings, or to present witnesses during such proceedings. Lake County APCD expressed concern over the validity of PG&E's air quality analysis methodology and emphasized the need for the Commission to firmly establish a listing of all air quality standards, ordinances, and regulations, with which the project would have to comply. However, in view of the fact that considerable data remain to be gathered, Lake County APCD elected not to present or cross-examine witnesses prior to issuance by the Committee of this Preliminary Report.

Discussion during the Conference with regard to Statements of Findings and Conclusions on the issue of public health resulted in revisions that enabled Commission staff and PG&E to sponsor a Joint Statement of Findings and Conclusions. Similarly, discussions among Lake County, PG&E, and Commission staff resulted in a revised PG&E and Commission staff Joint Statement of Findings and Conclusions and a revised Lake County Statement of Findings and Conclusions on socio/economic issues. No party objected to adoption by the Committee of any of the revised Statements of Findings and Conclusions.

7. Conference on Air Quality and Public Health Issues

Following the Prehearing Conference, the Committee found that it required further information on applicable federal, state, and local standards, ordinances, and laws; studies and reports undertaken in relation to the proceedings, particularly with regard to air quality; comments and recommendations on the Notice; and the status of PG&E's efforts to obtain permits from various government authorities for construction and operation of the project.

The Committee convened a conference to receive and consider such information on September 25, in Santa Rosa. The Applicant, ARB staff, Lake County APCD, Northern Sonoma County APCD, and NCPA participated in the conference, a more detailed discussion of which can be found in Sections III.B and V.

The findings and conclusions reached by the Committee as a result of all proceedings discussed in this section are set forth in subsequent sections of this Report.

8. Hearing on Preliminary Report

Following publication of the Preliminary Report, the Committee conducted public hearings in Lakeport and Santa Rosa on November 13, 1978, to receive comments from the parties and public on the Report. The Committee set November 20, 1978 as the deadline for receiving written comments.

During the public hearings, no party requested the Committee to hold evidentiary hearings to address any issue, whether stated or not, in the Preliminary Report. Nor has any written comment suggested such hearings.

The Committee has inserted the comments of the parties and public into the text of the Final Report. In the absence of any objection, the Committee has adopted amendments as proposed by various parties to its preliminary findings and conclusions.

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 Applicant's site and related facility with "any state law or local or regional ordinance or regulation, including any long-range land use plans or guidelines..."

II. CONFORMITY TO DEMAND FORECASTS

A. Need for Additional Generating Capacity

1. Introduction

Public Resources Code Section 25514 requires the Committee to determine "the conformity of alternative sites and related facilities designated in the notice or presented in the notice or presented at the informational hearing or hearings...(with) the 10 year forecast of statewide and service area electrical power demands pursuant to Section 25309....". The Commission's most recent forecast of statewide and service area electric power demands was adopted in March, 1977. This matter is also known as "determining the need for the project". With respect to the issue of need, the Commission staff and PG&E proposed the Findings and Conclusions set forth in subsection 3 of this section for adoption by the Committee.

2. Geothermal as a Preferred Technology

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

The Commission's Geothermal Policy Report, recognized 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 time frame shorter than power plants using other fuels.

3. Proposed Findings and Conclusions

PG&E and Commission staff proposed Joint Findings and Conclusions on the conformity of the proposed project with the Commission's most recent demand forecast as set forth on the following page.

Findings

1. If constructed according to present schedules, Geysers Unit 17 will begin commercial operation in 1982.

2. Geysers Unit 17 will have a net generating capacity of 110 MW.

3. The "most likely" demand forecast adopted by the Energy Commission, with adjustments, indicates a need in 1982 for additional generating capacity in excess of 110 MW for the PG&E service area.

4. Geysers Unit 17 is included in PG&E's generation expansion plans for 1982.

5. Under the "most likely" demand forecast adopted by the Energy Commission, PG&E's reserve margin in 1982, with the addition of Unit 17, will be 15.1 percent if facilities planned and under construction are commercially available on current schedules.

6. The policy of the California Energy Commission is to encourage the accelerated development of geothermal resources.

7. Geysers Unit 17 will generate baseload electricity.

8. The bus-bar cost of electricity generated at the Geysers Geothermal power plant is less than the bus-bar cost of electricity generated by other baseload resources.

Conclusions

1. The additional system capacity to be added by Geysers Unit 17 is consistent with the forecast of service area electric power demands adopted by the Commission pursuant to Public Resources Code section 25309.

2. Geysers Unit 17 is an acceptable means of supplying 110 MW of the total capacity needs for the PG&E service area in 1982.

4. Committee Findings and Conclusions

The Committee concurs with all of the findings set forth above and with Conclusion #1. With respect to Conclusion #2 the Committee believes it is premature to conclude that Geysers Unit 17 is an acceptable means of supplying 110 MW of the total capacity needs for the PG&E service area in 1982, until all other issues in this case have been resolved.

A. Introduction

In additon to determining the degree of conformity to 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 presented at a public hearing and considered by the Committee.

Public Resources Code Section 25540 eliminates the requirement for geothermal power plant Notices to contain alternate sites. Therefore, the findings and conclusions set forth in the following subsections speak to the merit of the single site proposed for the Geysers Unit 17 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 examine 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 federal 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. The NSCAPCD states that the Air Pollution Control Officer has the discretion to allow construction under such conditions.

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, a new source review must be conducted to examine 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.

A list of the applicable laws and regulations governing ambient air quality and new source review as discussed during the Committee's September 25 public health and air quality conference are set forth in subsection C.2. of this section.

2. Discussion

PG&E applied for its authority to construct from Northern Sonoma County APCD on September 12, 1978 and expects the APCD to act on its application by May, 1979. Pursuant to Northern Sonoma County PACD Rule 230 (New Source Review) and Rule 455 (Emissions Limitations) the Air Pollution Control Officer (APCO) shall approve Geysers Unit 17 if it is determined that the proposed project will meet the emission limitations of Rule 455 and will not cause a violation or prevent attainment of ambient air quality standards. If a facility cannot comply with Rule 230(a) a conditional approval under Rule 230(d) may be granted.

The ARB has stated that Rule 455, to the extent that it 1) necessitates the use of the best available control technology (BACT) to meet the emission

limitations set forth, 2) sets forth new emissions limitations and compliance dates for existing power plants, and 3) requires reduction of H_2S emissions from steam stacking during power plant outages, effectively preempts the BACT and emission offset provisions of Rule 230, Thus in the ARB's view, if Geysers Unit 17 can be shown to comply with Rule 455, then the Northern Sonoma County APCO can approve the project. In hearings on the Preliminary Report and in subsequent written comments the Northern Sonoma County APCD disagreed with the ARB view on Rule 455, stating:

> This District strongly feels the H_2S emission limits set forth in Rule 455 are not BACT but are values arrived at via "roll-back" to achieve attainment. This District feels BACT would be closer to 8 gm/GMW-hr. and strongly feels it is achieveable and therefore disagrees with section III.B.4. (pg. 21 of the Preliminary Report). However, if this were the case, Pacific Gas and Electric Company would certainly opt for 39 gm/GMW-hr. which is below the new source review initiation trigger.

All parties agree that Geysers Unit 17 may be subject to U.S. Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) regulations because it has the potential to emit more than 25 lb./hour or 250 lb./day of H_2S (See Commission staff Air Quality Position Paper, pp 25-26). Commission staff, ARB staff, and Lake County APCD submitted an EPA General Counsel's memorandum [Clyde D. Eller, Director of the Enforcement Division, EPA Region IX "Applicability of Section 169 of the Clean Air Act (PSD) in Respect to the Control of Hydrogen Sulfide Emissions from New Geothermal Power Plants in California"] in support of the view that PSD regulations do apply. PG&E stated that, as of September 25, 1978, it had not yet been officially and directly informed in response to its inquiry of EPA as to whether or not PSD regulations applied to the power plant (TR 355-356, 9/25/78).

The Committee is concerned with this issue insofar as fulfilling its responsibility to identify applicable laws and determine Geysers Unit 17's conformity with them is concerned. PG&E has clearly stated its intent to

apply for a PSD permit if EPA notifies it that one is required (TR 351, 355-356, 9/25/78) and Commission staff, ARB staff, and PG&E all agree that given the fact that PSD regulations require the use of BACT, if Geysers Unit 17 can be shown to comply with Northern Sonoma County APCD Rule 455 (which presumes the use of BACT) then it will comply with PSD regulations (air quality Finding 21). This is true, however, only if EPA agrees that the Stretford unit and surface condenser and whatever additional treatment that may be proposed for use on Geysers Unit 17 to control H_2S emissions is BACT (TR 360-374, 9/25/78).

Although Geysers Unit 17 has the potential to emit more than 250 tons per year of H_2S, the threshold requirement for application of EPA's PSD regulations, it is uncertain whether the PSD regulations will apply to this facility. PG&E's letter of October 16, 1978, regarding applicability of PSD regulations to Geysers Unit 17 has been forwarded to EPA's Division of Stationary Source Enforcement in Washington D.C. for comment. (Proposed by PG&E).

Lake County APCD has pointed out that the Committee should establish whether PSD regulations concerning visibility apply to Geysers Unit 17. Commission staff maintains that, in the Geysers area, they would not (TR 354-355, 9/25/78).

Commission staff, ARB staff, Lake County APCD, and Northern Sonoma County APCD have all questioned the validity of the model and the adequacy of the air quality analysis which PG&E has used to predict the impacts of H_2S emissions from Geysers Unit 17 on ambient air quality (TR 399-411, 9/25/78). PG&E maintains that its model is adequate but has agreed to participate in a joint air quality and meteorological study, to perform another air quality analysis using the results of the study and to present the results of the

analysis at the time of filing of the AFC. The additional analysis and air quality and meteorological study are discussed in proposed air quality Findings 42 thru 48 and Conclusions 11 and 12.

Meanwhile Commission staff has submitted interrogatories to PG&E, the answers to which are intended to enable Commission staff and other parties to assess the validity of PG&E's air quality model. Northern Sonoma County APCD, prior to issuance of the Preliminary Report, held that, based on PG&E's analysis, Geysers Unit 17 itself could probably receive the necessary air quality approval, but the steam field could not because H_2S ambient air quality standards would be violated (TR 401, 9/25/78).

The NSCAPCD position regarding the air quality impacts from the steam field is based upon data submitted at the time of the filing of the NOI. Since that time, stacking emission limits and procedures have changed. Union Oil has advised the NSCAPCD that the emission limts should be attainable by the time Unit 17 becomes operational. (See the attached letter from Warren Smith of Union Oil to Michael Tolmasoff, NSCAPCD.)

Finally, several parties to the proceeding have raised the issue of whether construction and operation of Geysers Unit 17 will preclude further geothermal development in the Geysers (See Petitions to Intervene by DWR and NCPA and Commission Staff Submittal to 9/25/78 conference).

At the Prehearing Conference on August 22, 1978, and at the Committee Conference on September 25, 1978, all parties discussed the issues concerning air quality, including aspects of attainment of air quality standards and conformity to emission limitations, which needed further resolution and the status of the various studies which PG&E and other parties have agreed to undertake to assist in resolving such issues. References to these studies are found throughout the Findings and Conclusions (Subsection B.3.) on air quality issues that the Commission staff, PG&E, and the ARB staff have

jointly proposed to the Committee for adoption in the Preliminary Report and the Final Report. The relationship of these studies to issues requiring further review by the Committee is discussed in Section V.

3. Air Quality Standards Governing Geysers Unit 17

	Relevant Air Quality Findings and Conclusions	Preliminary Conclusion Regarding Compliance
1. NSCAPCD Rule 455(b) (applicable beginning 1/1/80) 100 grams/gross Megawatt hour (gr/GMh) of hydrogen sulfide (H_2S)	Findings 5-14 & Conclusions 1 and 2	more information required
2. NSCAPCD Rule 455(b) [1/] (applicable beginning 1/1/85) 50 gr/GMh H_2S	Finding 28	more information required
3. NSCAPCD Rule 455(a) 1000 parts per million (ppm) or less of emissions of sulfur compounds, calculated as sulfur dioxide (SO_2)	Findings 16, 17, 29, and 30 Conclusion 4	complies
4. NSCAPCD Rule 420(d) Limits emissions of particulate matter to the lesser of: 0.20 grains per cubic foot (gr/acf) or 40 lb/hr from a source with a process weight rate of 60,000 lb/hr.	Findings 18 and 19 Conclusion 4	complies[2/]

1/ PG&E listed this standard among those applicable to Geysers Unit 17 in its September 25 submittal to the Committee, but believes that since it is subject to a hearing before it takes effect it is not necessary to demonstrate conformity with this standard in order for the Commission to certify the power plant. NSCAPCO, Mr. Tolmasoff, agrees that the rule is not currently on the books and that he could approve Geysers Unit 17 if it complied with the 100 g/gMWh standard. Commission staff believes that the Committee should consider the potential for Geysers Unit 17 to comply with the 50 g/MWhr standard as an issue but that a finding of conformance is not necessary in order for the Commission to certify the project (TR 344-346, 9/25/78).

2/ Lake County APCD questions this conclusion, but has not provided any information to contradict it.

5.	EPA Prevention of Significant Deterioration (PSD) for H_2S	Findings 20, 21, 33, and 34 Conclusion 5 and Committee Findings and Conclusions	more information required
6.	NSCAPCD Rules 220 and 230 New source review rules	Findings 38-55	more information required
7.	NSCAPCD Rules 400(a) (Nuisance) and 540 (Control Breakdown)	TR 382-388, 9/25/78	more information required
8.	NSCAPCD Rule 160 Ambient Air Quality Standards	Findings 41-49 Conclusions 9 and 10	

Pollutant	California Standard	Averaging Time	
H_2S	0.03 ppm	1 hour	more information required
SO_2	0.05 ppm	24 hours	complies
	.5	1 hour	
Sulfates	25 mg/m^3	24 hours	appears to comply, confirmation data required
TSP	60 mg/m^3	Annual Geometric Mean	complies
	100 mg/m^3	24 hours	

The parties disagree concerning the need for the Commission to make a finding of conformity with the following rules:

		Relevant Air Quality Findings and Conclusions	Preliminary Conclusion Regardin Compliance
1.	NSCAPCD Rule 455(d) Table II. Limits emissions of hydrogen sulfide (H_2S) stacking (venting to the air during power plant shut-down) during scheduled and unscheduled outages	Findings 25-30 Conclusions 3 and 10	more information required
2.	NSCAPCD Rule 420(d) Limits emissions of particulate matter during stacking to the lesser of 0.20 grains/scf or 40 lb/hr	Findings 31 and 32 Conclusions 4 and 10	complies
3.	NSCAPCD Rule 455(a) Limits emissions of sulfur compounds, calculated as SO_2 to 1000 ppm or less during periods of steam stacking	Findings 29 and 30 Conclusions 4 and 10	complies

PG&E contends that these Rules apply to the steam well operation of Union Oil Company and not to Geysers Unit 17, but has agreed, nonetheless, to provide information that will enable analysis of compliance with the rules to be performed. Staff contends that the steam well system, muffler and power plant are an integrated whole and, therefore, the Committee must determine conformity of all to applicable regulations or at least review the stacking emissions in carrying out its environmental review pursuant to the California Environmental Quality Act (TR 336-344, 443-445, 9/25/78).

Lake County Air Pollution Control District contends that its Rules pertaining to Nuisance (Rule 430) and New Source Review (Rule 602, 605c) must be considered by the NSCAPCD in issuing a permit so as to not prevent geothermal development in Lake County even though attaining air quality standards in Northern Sonoma County (See Lake County Submittal, Appendix C). Northern Sonoma County APCD believes that the Committee should consider whether the plant is designed so as to avoid causing a public nuisance or exceeding a national ambient air quality standard, therby violating the District's rules 400-A and 540 during breakdowns.

PG&E agrees with the view that the NSCAPCD must consider the air quality in Lake Coutny before issuing a permit according to Rule 220(b)(2).

4. Proposed Findings and Conclusions

Following are the proposed joint findings and conclusions on the Commission staff, PG&E, and the ARB staff on air quality:

Findings - Emissions Limitations - Normal Power Plant Operation

1. *The Applicant has stated that Unit 17 is scheduled to begin operation in 1982.*

2. *Unit 17 will have a guaranteed gross generating capacity of 120 MW.*

3. *At the time Unit 17 is scheduled to begin operation, the hydrogen sulfide (H_2S) emissions limitation during normal power plant operation will be 100 grams/gross MWh (26.4 lb/hr) pursuant to Northern Sonoma County Air Pollution Control District (NSCAPCD) Rule 455(b).*

4. *Beginning January 1, 1985, Unit 17 will be limited by Rule 455(b) to H_2S emissions of 50 grams/gross MWh (13.2 lb/hr) subject to review by the NSCAPCD before January 1, 1984.*

5. *The steam supply for Unit 17 will be approximately 2,000,000 lb/hr, with an H_2S content of 350 $\pm$ 100 ppm. This results in a total H_2S flow rate of 500-900 lb/hr.*

6. *The Applicant has proposed to meet the applicable H_2S emissions limitations by employing a surface condenser and Stretford H_2S abatement systems.*

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

8. *The NOI and references submitted do not contain sufficient information to determine whether the Stretford unit which will be employed on Unit 17 is correctly sized.*

9. *The Applicant has agreed to provide detailed information on the design criteria and capacity of the Stretford unit to treat that H_2S which reaches the unit at or prior to the filing of an AFC for Unit 17.*

10. 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.

11. If the surface condenser partitions less than 95-98% of the H_2S into the gas stream (depending on the H_2S concentration in the steam supply for Unit 17) the H_2S remaining in the steam condensate will require treatment if the plant is to meet the 100 grams/gross MWh emissions limitation.

12. The partitioning efficiency of the surface condenser proposed is not presently known. The Applicant estimates a partitioning efficiency of 80-98%.

13. Unit 15 is the first Geysers power plant utilizing a surface condenser scheduled to begin operation. Unit 15 is scheduled to begin operation in late 1978.

14. Because the ability of Unit 17 to meet the 100 grams/gross MWh is dependent on the partitioning efficiency of the surface condenser, the Applicant has agreed to, if the NOI is approved, file an AFC which either:

a) contains sufficient operating data from Unit 15 to determine, with reasonable certainty, that the partitioning efficiency of the surface condenser will be sufficient to meet the 100 grams/gross MWh limitation, or

b) contains specific proposals for condensate treatment systems which will be installed prior to commercial operation of Unit 17 in the event that the operating data from Unit 15 indicates that the partitioning efficiency of the surface condenser is not sufficient to meet the 100 grams/gross MWh limitation, or if sufficient data from Unit 15 is not available at the time of the AFC filing.

It now appears the commercial operation date for Unit 15 will be delayed until early 1979.

15. The Applicant has agreed to, at or prior to the time an AFC for Unit 17 is filed, provide detailed information on the alternative control methods that could be employed to achieve the 50 grams H_2S/GMh limitation of Rule 455(b), scheduled to take effect on January 1, 1985, subject to review by NSCAPCD before January 1, 1984.

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

17. Unit 17, as proposed in the NOI, will emit less than 10 ppm of sulfur compounds, calculated as SO_2.

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

a) 0.20 grains per standard cubic foot (scf), or

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

19. Unit 17, as proposed in the NOI, will emit approximately 0.0002 grains/scf, or 1.4 lb/hr, of particulate matter. (Note: At the Committee Conference on September 25, 1978, PG&E suggested amending this finding by substituting the figures ".000002" grains/scf and "0.24" lb/hr. Staff did not contest this amendment during hearings on the Preliminary Report. ARB expressly agreed to the amendment. Therefore, the admendment is adopted.

The emission rates that have been provided for particulate matter thus far have not included the emissions from the Stretford unit cooling tower, nor emissions from the power plant cooling tower if secondary treatment is required. The particulate emissions data are now being reviewed to reflect the condensate samples from the existing Unit 17 steam wells, as required by the NSCAPCD, and also to incorporate emissions from both the Stretford unit and from potential condensate treatment processes. When this review is completed, a revised emission rate will be provided to the NSCAPCD

and to the Energy Commission. The Applicant expects that the revised emission rate will be below the allowable emission rate.

20. Federal Prevention of Significant Deterioration (PSD) requirements may apply to Unit 17. EPA may require Unit 17 to employ Best Available Control Technology (BACT) for H_2S.

21. If Unit 17 can be operated in compliance with the H_2S emissions limitations of NSCAPCD Rule 455, Unit 17 will satisfy federal BACT requirements.

22. The Environmental Protection Agency has prescribed PSD increments for SO_2 and for Total Suspended Particulates (TSP).

23. Emissions of SO_2 from Unit 17 during normal plant operation are not sufficient to require PSD review for SO_2.

24. Emissions of TSP during normal plant operation are not sufficient to require PSD review for TSP.

PSD review for particulates could be required, depending upon EPA's calculation of "potential emissions" and on the type of treatment, if any, required for the Unit 17 condensate.

Emissions Limitations - Steam Stacking

25. The Steam Supplier states that during powerplant outages of less than four days, the steam supplying Unit 17 will be "stacked" (vented) at the steam release valve through a bank of rock mufflers.

26. NSCAPCD Rule 455(b) is subject to review on or before January 1, 1981. Rule 455(b) scheduled to take effect on January 1, 1982, limits the H_2S emissions during steam stacking as follows:

a. for an unscheduled outage of a power plant, H_2S emissions must be limited to 10% or less of the H_2S contained in the steam supply at full power plant load within four hours of the outage;

b. for an unscheduled outage of a power plant utilizing twin turbines, H_2S emissions must be limited to 50% of the H_2S contained in the steam supply at full power plant load within four hours of a simultaneous outage of both units;

c. the emission reductions specified in (a) and (b) must be attained within one hour of a scheduled outage greater than four hours;

d. Rule 455 states that these percentage reductions need not be attained if stacking emissions do not exceed 15 kg/hr/unit.

27. The NOI states that H_2S emissions during stacking will be reduced by 53% for an unscheduled outage of 2-24 hours. The 53% reduction would not comply with NSCAPCD Rule 455(b), if paragraph 2(a) above applies.

28. The Applicant has agreed to, at or prior to the time an AFC for Unit 17 is filed, obtain and provide detailed information from the steam supplier on the control methods that will be employed to comply with the H_2S stacking emissions limitation of NSCAPCD Rule 455(b).

29. NSCAPCD Rule 455(a) limits emission of sulfur compounds, calculated as SO_2, to 1000 ppm or less during periods of steam stacking.

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

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

a) 0.20 grains per standard cubic foot (acf), or

b) 40 pounds per hour.

32. Emissions of particulate matter during stacking will be significantly less than either:

a) 0.20 gr/acf, or

b) 40 lb/hr.

33. Pursuant to federal PSD requirements BACT may be required for H_2S.

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

35. The Environmental Protection Agency has prescribed PSD increments for SO_2 and for TSP.

36. Emissions of SO_2 from the Unit 17 steam release valve during periods of steam stacking will be substantially less than that required for PSD review.

37. Emissions of TSP during periods of steam stacking will be substantially less than that required for PSD review.

New Source Review

38. 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.

39. Unit 17 will emit more than 250 lb/day of H_2S during normal power plant operation.

40. The Unit 17 steam release valve will emit more than 25 lb/hr of H_2S during periods of steam stacking.

41. The state ambient air quality standard for H_2S is 0.03 ppm averaged over one hour. This standard may not be equalled or exceeded.

42. The Applicant's air quality analysis of the impacts of H_2S emissions from Unit 17 (during normal power plant operation and stacking conditions) on the ambient H_2S concentrations is not satisfactory to the staffs of the California Energy Commission, the California Air Resources Board, Lake County Air Pollution Control District or Northern Sonoma County Air Pollution Control District.

43. 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 point of sensitive receptors. This analysis should:

a) assess impacts of normal plant operation and of steam stacking during plant shutdown.

b) assume H_2S concentration from other contributing sources for the initial year of operation that is consistent with all applicable source emissions limitations which are in effect at the time of filing the AFC.

44. If the analysis described in Finding 43 shows a violation of the H_2S standard, at sensitive receptors, the Applicant may provide a similar analysis assuming H_2S concentration from other contributing sources 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.

45. *The Applicant has agreed to perform the analysis identified in Findings 43 and 44 for the following meteorological conditions:*

a) *nocturnal drainage;*

b) *subsidence inversion with an inversion top of not less than 3500 feet (MSL);*

c) *downwash;*

d) *those conditions present during days identified by the Lake County Air Pollution Control Officer at the Pine Summit, Kahn Ranch, and Sawmill Flat monitoring stations, and*

e) *those conditions present during the highest H_2S concentrations recorded at Pine Summit, Kahn Ranch, and Sawmill Flat as identified in the NOI on Table 2.1-1.*

f) *those conditions present during days having the highest number of H_2S exceeds at the Pine Summit, Kahn Ranch, and Sawmill Flat monitoring stations.*

46. *The Applicant has proposed to participate in a joint air quality and meteorological study to provide data sufficient to adequately perform the analyses as specified in Findings 43, 44, and 45.*

47. *The staff of the CEC and the California Air Resources Board (CARB) have reviewed the proposed joint air quality and meteorological study and agree that if the study is performed as required by the final work statement agreed to by all parties to the study, sufficient data will be available to enable the Applicant to perform the analyses as specified in Findings 43, 44, and 45.*

48. Information from the proposed study will not be available to perform the analyses specified in Findings 43, 44, and 45 during proceedings on the NOI for Unit 17.

49. With the possible exception of the H_2S standard, Unit 17, 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.

50. NSCAPCD Rule 230 may require compliance with emissions limitations from existing sources in the Geysers as a condition for allowing the operation of Unit 17. At the time Unit 17 is scheduled to begin operation, Units 3,4,5,6,11, and 12 will be allowed to emit no more than an average of 200 grams per gross megawatt hour (g/GMh) or no more than 10% of the H_2S in the supplied steam at full power plant load.

51. The Applicant has not provided sufficient information to demonstrate that Units 3,4,5,6,11, and 12 will comply with the requirements of Rule 455.

52. The Applicant has agreed to, at or prior to the filing of an AFC for Unit 17, provide detailed information as to how Units 3,4,5,6,11 and 12 will comply with Rule 455.

53. NSCAPCD Rule 455 requires emissions limitations for Units 1,2,7,8, 9, and 10 to be adopted on or before January 1, 1980.

54. The model rules adopted by the CARB would require H_2S emissions from Units 1,2,7,8,9, and 10 to be reduced to a maximum of 200 g/GWh for each unit by January 1, 1984.

55. NSCAPCD Rule 455 requires the Control Officer to promulgate emissions limitations for Units 1,2,7,8,9, and 10 on or before January 1,1980. For purposes of the analysis specified in Finding 44 above, it is presumed that the emissions limitations adopted by the NSCAPCD for these units will be at least as stringent as the emissions limitations prescribed by the CARB model rule.

Conclusions

1. *If the Applicant files an AFC for Unit 17, it shall include either:*
   a) *sufficient operating data on the surface condenser partitioning efficiency from Unit 15 to determine with reasonable certainty that Unit 17 will meet the 100 g/MWh H_2S limitation without condensate treatment, or*
   b) *specific proposals for condensate treatment systems which will be installed prior to the commercial operation of Unit 17 in the event that the partitioning efficiency of the surface condenser is not sufficient to meet the 100 grams/GMWh limitations.*

2. *The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the design criteria and capacity of the Stretford unit as proposed to treat that H_2S which reaches the unit.*

3. *The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the control methods that would be employed to comply with the 50 g/MWh emissions limitation of NSCAPCD Rule 455(b), scheduled to take effect January 1, 1985.*

4. *Unit 17, as proposed in the NOI, will comply with applicable emission limitations for all pollutants other than H_2S during normal power plant operation.*

5. *Unit 17, as proposed in the NOI, will comply with federal PSD requirements during normal power plant operation.*

6. *The Applicant shall, at or prior to the time an AFC for Unit 17 is filed, obtain and provide from the steam supplier detailed information on the control methods which would be employed to comply with the H_2S stacking emissions limitations of NSCAPCD Rule 455(b), scheduled to take effect January 1, 1982.*

7. The steam release valve will comply with applicable emissions limitations for pollutants other than H_2S during periods of steam stacking.

8. Emissions from the steam release valve will comply with federal PSD requirements during periods of steam stacking.

9. With the possible exception of emissions of H_2S, Unit 17 will, during normal power plant operation, comply with applicable ambient air quality standards.

10. 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.

11. The Applicant shall perform the air quality analyses described in Findings 43, 44, and 45 (New Source Review), and shall provide the results of such analyses at the filing of the AFC for Unit 17.

12. The Applicant shall participate in the joint air quality and meteorological study described in Finding 46 (New Source Review), and shall provide the available results applicable to Unit 17 at the filing of the AFC for Unit 17.

13. The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the control methods which will be employed on Units 3,4,5,6,11, and 12 to comply with the emissions limitations of NSCAPCD Rule 455.

5. Committee Findings and Conclusions

With the exception of Findings 21 and 34 regarding compliance with federal BACT requirements and Conclusions 5 and 8 regarding compliance with PSD requirements, the Committee adopts the proposed findings and conclusions as set forth above for the Final Report. Based on discussions at the September 25 conference, the Committee feels that further consideration of what constitutes BACT is warranted. We sought and will continue to seek the assistance of EPA in pursuing this issue.

C. Other Site-Related Issues

1. Proposed Findings and Conclusions

The following are the Joint Findings and Conclusions on Noise, Water Quality, Hydrology and Water Resources, Soils, Biological Resources, Socio-Economics, and Cultural Resources, that the Commission staff and PG&E have proposed for adoption by the Committee. Also included are the Findings and Conclusions on Socio-Economics proposed by Lake County with which the Commission staff agreed and to which PG&E did not object.

PROPOSED 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 55dBA L_{dn}. 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 section 5095-5099 and Cal. Vehicle Code section 23130.*

3. *The federal standards are set by the Occupational Safety and Health Act of 1970 and are basically the same as CAL-OSHA standards.*

4. *The ambient noise levels of the site and sensitive receptors are contained in the NOI at page 66 and Appendix G, page 9-2.*

5. *The closest identified sensitive residential receptor to Unit 17 is 1.2 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 be inaudible to the other identified sensitive receptors which are farther distant than 1.2 miles.*

6. *The third octave band noise frequency data for the cooling tower, steam jet ejector and turbine generator are contained in Exhibit G, page 9-2 of the NOI. Certain tonalities from the steam jet ejector and turbine generator are expected to be discernable 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 discernable tonalities are expected from the cooling tower.*

7. *The following mitigations are to implemented by the Applicant.*

a) *Path treatment will be installed on the exterior surfaces of the steam jet ejectors and will consist of mineral wool and an impervious membrane (aluminum and/or lead jacket).*

b) *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 reduce noise propagating to the outside environment.*

d) *A sound-proof office space will be built on the turbine-generator floor inside the building.*

e) *PG&E's present purchase specifications for mechanical equipment encourages 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 installed and operated by the steam supplier.*

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

9. *PG&E 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.

10. The complete list of noise sources and levels associated with steam supply activities are set forth in the Environmental Impact Report for Union Oil, Unit 17 (December 1977) and Union Oil simplified noise model, Unit 17 geothermal development area (March 1978).

11. The projected noise levels for production well testing with portable test mufflers, steam transmission lines start-up the unmuffled venting and well head master valve changes will be significant noise sources and will be discernable to local receptors. However, these three events occur infrequently. The noises other than the above three associated with the steam field development production would be discernable to Lake County receptors. They would not be audible to any of the receptors in Sonoma County.

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

13. No further analysis of noise impacts from construction and operation of the power plant is anticipated.

Conclusions

1. The Applicant shall undertake the noise impacts mitigation measures specified in Finding Number 7.

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

3. With the implementation of the noise impacts mitigation measures specified in Finding Number 7, power plant noises during normal operations will be in compliance with Lake and Sonoma County noise standards and with the requirements of CAL-OSHA and with federal standards.

4. With the implementation of the noise impacts mitigation measures specified in Finding Number 7, noises during periods steam stacking will be inaudible to the closest receptors to the power plant site.

5. With the implementation of the noise impacts mitigation measures specified in Finding Number 7, noises during periods of steam stacking will be in compliance with Lake and Sonoma County noise standards and with the the requirements of CAL-OSHA and with federal standards.

6. Noises caused by steam field operations will be generally discernable to the local receptors, but such noises are within the tolerable range.

7. Noises caused by construction of the power plant and related facilities will be discernable to some of the receptors closest to the power plant site but will be in compliance with Lake and Sonoma County noise standards and CAL-OSHA requirements and federal standards.

8. The Applicant shall limit the use of heavy earth moving equipment to daylight hours whenever possible. If the Applicant limits the use of earth moving equipment to daylight hours, the noises caused by plant construction will to tolerable to local receptors.

9. No adjudication of issues related to the impacts of noises caused by power plant construction and operation is anticipated at either the NOI or the AFC for Unit 17.

PROPOSED FINDINGS AND CONCLUSIONS
WATER QUALITY

Findings

1. *The Stretford effluent and steam condensate contain substances which are classified as toxic and hazardous.*

2. *The Stretford effluent will be* elemental sulphur *and Stretford purge stream. The latter will be pumped into the base of the cooling tower for reinjection. The former will be temporarily stored at the site in an enclosed container, and either sold for use or disposed of at an approved site.*

3. *The steam condensate will be utilized for cooling water and the excess will be reinjected. In the event of a spill, the retention basin construction around the entire plant site would be adequate to prohibit escape of any reasonably expectable spill.*

4. *The cooling tower will emit droplets which contain certain toxic chemicals. These droplets would not be deposited or otherwise reach surface waters in such quantities as to be measurable.*

5. *The water quality standards* potentially applicable to the project include:

   a) *U.S. Environmental Protection Agency Water Quality Criteria (1976).*

   b) *North-Coast Basin Plan.*

   c) *Porter-Cologne Water Quality Act.*

   d) *23 California Administrative Code.*

   e) California Health and Safety Code section 25100;

   f) 22 Cal. Administrative Code section 60001.

6. The Applicant has proposed to implement the following mitigation measures to control and preserve water quality.

a) A retention barrier will surround the entire plant to contain any spills. The barrier will be impermeable and have a volume of 170,000 gallons. The lowest point in the barrier will contain a catch basin with pump facilities and alarm devices. (NOI pg. 3-1).

b) A monitoring program has been instituted in order to evaluate long term impacts of the construction and operation of Unit 17. (NOI pg. 120, App. III, pg.28).

c) The reinjection pond will hold 225,000 gallons, and have a freeboard of 2 feet and be equipped with high and low level alarms. (NOI, pg. 3-2).

d) Those measures outlined in Finding Number 3 of the Soils Findings.

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. Plume drift deposition will not measureably affect water quality.

3. For the protection of water quality, Applicant shall implement the mitigation measures specified in Finding Number 6.

4. If the Applicant follows the proposals outlined in Finding Number 6, the project will not exceed water quality standards.

5. Staff and Applicant agree that no adjudication of these issues are (sic) required in the NOI or AFC.

PROPOSED FINDINGS AND CONCLUSIONS
HYDROLOGY AND WATER RESOURCES

Findings

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

2. The total plant 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. Location of the site on a ridge line is such that there is little surrounding watershed upon which to generate overland flows.

5. The plant site is located 400 feet above Squaw Creek. Even under the worst case conditions, because of the elevation the flows of Squaw Creek would not flood the plant site.

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 from the nearest surface water (Squaw Creek) is virtually non-existent.

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

Findings

1. *The estimated erosion rates and sediment transport for the project area are contained in the NOI, Section 7.1.*

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.* (steam field)

   b) *Sonoma County Water Agency and Flood Control District Ordinances.* (steam field and power plant)

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

   a) *The temporary and permanent measures outlined in the NOI at pages 113-118.*

4. The mitigation measures that will be utilized for the steam field to control soil loss and erosion are as follows:

   a) "Earthwork and Construction Specifications, Geysers Area of Sonoma County," Union Geothermal Division, Union Oil Company of California.

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

5. *The Design basis for the sedimentation basin was not adequately addressed in the NOI and further consideration of the specifics is necessary.*

Conclusions

1. The estimated amount of erosion and sediment transport, coupled with the mitigation measures, indicates that there is a limited potential for high erosion and sediment transport.

2. The Applicant shall address in the AFC the design specifics of the sedimentation basin.

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

4. If the mitigation measures in proposed Finding Number 3 above are implemented, this project will comply with the applicable standards.

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

"6. Union Oil will implement the measures outlined in Finding 4a (which are equivalent to the measures in 4b) in order to comply with the permit conditions of Lake and Sonoma Counties. The North Coast Regional Water Quality Control Board requires implementation of Finding 4c as part of its discharge permit."

Findings

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

- *Endangered Species Act of 1973 and implementing regulations*
- *Ecological Reserve Act of 1970 and implementing regulations*
- *Endangered Species Act of 1970 and implementing regulations*
- *California Fish and Game Code Sections 3511, 4700, 5000, 5050, 5515, and implementing regulations.*

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 Unit 17 site.

5. The Unit 17 site is not included within the federally proposed "Critical Habitat Zone" for the American Peregrine Falcon.

6. There are no rare, threatened, or endangered wildlife species known to exist at the Unit 17 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 Resources Area.

9. The Unit 17 is not known to be a significant breeding or feeding area for either the Golden Eagle or the Ringtail Cat.

10. No rare or endangered plant species are known to exist at the Unit 17 site.

11. The Applicant has proposed to undertake mitigation measures for the protection and preservation of biological resources. These mitigation measures are specified in the NOI on pages 113, 116, 117, and 118.

12. Areas of critical concern which may contain unique habitats and which therefore may need special protection are known to exist at or near the Unit 17 site.

13. Mitigation measures proposed by the Applicant are adequate to protect areas of critical concern at or near the Unit 17 site.

14. Species of recreational value are known to exist in or near the Unit 17 site.

15. Mitigation measures proposed by the Applicant are adequate to protect species of recreational value in or near the Unit 17 site.

16. Vegetation stress has occurred from cooling tower drift at the Geysers.

17. Most of the stress has occurred within 1000' of the cooling towers. The Applicant is studying the effects of cooling tower drift on vegetation and reports on these studies will be submitted at or prior to the AFC and an interim report on this study will be completed in the near future.

18. The drift rate of the cooling tower proposed at Unit 17 is less than that utilized at other operating generating Geysers plants, and the fraction of large drift droplets will be reduced.

19. The Applicant contends that the design of the Unit 17 cooling tower will minimize the localized vegetation stress.

20. The Staff does not believe that there is sufficient information to determine the extent or significance of localized vegetation stress from the Unit 17 cooling tower drift.

21. The cumulative effect of cooling tower drift deposition is uncertain and further studies are needed in order to determine the impact of long term low level exposure to vegetation from cooling tower drift.

Conclusions

1. The Applicant shall undertake the mitigation measures specified in Finding Number 11.

2. With the implementation of the measures specified in Finding Number 11, the Unit 17 power plant and related facilities can be constructed and operated in compliance with applicable standards for the protection and preservation of biological resources.

3. The Applicant shall provide the Staff a report on the studies and make available for inspection the data it has collected regarding the effects of cooling tower drift deposition at or prior to the filing of the AFC.

4. The Staff shall report to the Committee after it has reviewed the Applicant's report and shall make its recommendation as to the need to continue the existing study or whether additional studies are needed in order to assess potential long term chronic effects on vegetation from low level exposure to low level chronic toxicity from all steam and drift emissions resulting from geothermal development.

5. Staff and Applicant agree that no adjudication of these issues are (sic) *necessary in the NOI.*

PROPOSED FINDING AND CONCLUSIONS
SOCIO/ECONOMICS

Findings

1. *The proposed project will employ approximately 70-85 workers during the power plant's peak construction time, and have an average employment level of 50 workers during its 28 month construction period.*

2. *The Applicant's previous operations in the Geysers area have established a resident labor force in the Sonoma-Lake County Area.*

3. *Both Lake and Sonoma Counties will have economic impacts from the construction and operation of the Unit 17 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 Unit 17 project. Sonoma County will most likely receive the greater amount of these payroll effects.*

4. *Sonoma County will receive property 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 Unit 17 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 County, as well as by the communities near the project, as a result of Unit 17'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 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 compatability 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 the application of 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 compatiblity 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 Geysers 17 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 the local communities near to the project, as a result of Unit 17's construction and operation appear at this time to be less than the anticipated tax revenues associated with the project. Project tax revenues, as well as effects from construction payrolls appear 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.

PROPOSED FINDINGS ON SOCIO/ECONOMICS OFFERED
BY LAKE COUNTY, AND ACCEPTED WITHOUT OBJECTION BY PG&E AND CEC STAFF

1. Lake County will receive no property tax revenues from the proposed power plant itself.

2. Lake County will derive revenue from the development of that portion of the Unit 17 steam field which lies within the County's boundaries if the necessary permits are issued by Lake County.

3. The immediate direct and indirect costs to be borne by Lake County as a result of Unit 17's construction and operation will be minimal.

4. The operation of Unit 17 will impose some burdens on County Government.

5. The operation of Unit 17 may preclude further geothermal development in portions of Lake County; if this should in fact occur, there will be a resultant economic loss in the private sector and public sector.

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.

3. The plant site and steam field have been evaluated for archeological sites and artifacts and none were present in either area.

4. The remaining cultural resource considerations have not been fully evaluated. Applicant will perform a full cultural resources survey and provide such report to the Commission promptly upon its completion. Such survey shall be filed prior to or at the time of filing of the AFC.

5. Applicant has proposed to consult in a timely manner with Commission Staff on the scope and methodology of the study, and Staff may make recommendations for additional mitigation measures if any are necessary.

Conclusions

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

2. The existence and significance of paleontological, historical, and ethnographic resources, as well as resources of educational, scientific, or religious significance cannot be determined until the Applicant has completed the cultural resources survey as specified in Findings 3 and 4. Such survey shall be filed prior to or at the time of the filing of the AFC.

3. Subject to compliance with the requirements of Findings 3 and 4, Applicant and Staff agree that no adjudication of these issues are (sic) *necessary during the NOI process.*

2. Committee Findings and Conclusions

The Committee adopts all of the findings and conclusions on noise, water quality, hydrology and water resources, soils, biological resources, socio/economics, and cultural resources as proposed by Commission staff and PG&E and with respect to socio/economics, by Lake County.

In commenting on the Preliminary Report Northern California Power Agency (NCPA) objected to Finding 5 on Socio/Economics as proposed by Lake County, stating:

> First, this finding states nothing more than conjecture; no factual basis adopted by this Commission exists, nor is contained in the Preliminary Report that would lead to the conclusion that operation of Unit 17 may preclude further geothermal development in Lake County. In this regard, proposed finding number 5 is inconsistent with item number 8 at page 50. "the proposed power plant is located in an area whose principal land use is the exploration, development and utilization of geothermal energy and which has numerous geothermal power plant in operation."

The Committee agrees that the statement is conjecture, thus the use of the word "may" as opposed to "will". The finding is, however, based on statements by and a letter, which NCPA itself submitted to this proceeding, from Lake County officials that air quality (not land use) considerations may preclude further geothermal development. The Committee has reached no conclusion that development will be precluded. Only information that will be available in the AFC would enable such a determination to be made.

IV. PUBLIC HEALTH, SAFETY AND RELIABILITY

A. Introduction

Public Resources Code Sections 25514 and 25511 require the Commission to consider 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 today. 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 determination required by Public Resources Code Section 25511. For example, Findings 1-55 and Conclusions 1-13 on air quality, Findings 1-6 and Conclusions 1-4 on water quality, Finding 5 and Conclusion 2 on hydrology and water resources, and Finding 2 on soils 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 issues that are particularly relevant to making safety and reliability determinations for geothermal power plants. These are the geotechnical and structural engineering issues that are discussed in Section IV.C

B. Public Health

1. Introduction

At the Prehearing Conference on August 22, 1978, and at the Committee Conference on September 25, 1978, all parties discussed information that would be available to assist in resolving certain issues concerning the public health impacts of emissions from Geysers Unit 17. This information includes the studies referenced in findings and conclusions on public health and air quality and listed in Section V of this report. In addition, at this Conference, Commission staff and PG&E submitted lists of applicable public health standards, ordinances, and laws, which have been consolidated into the list reproduced below. Staff and PG&E also agreed that certain issues dealing with the appropriateness of the H_2S public health standards could not be resolved at all in the course of either Notice or Application proceedings because of lack of sufficient data and information (See Public Health Findings 3, 4, and 5 and Conclusion 2). It is also PG&E's position that the Committee should recognize that the State H_2S ambient air quality standard is a nuisance standard as opposed to a public health standard. The Commission staff maintains that the standard involves public health considerations. (TR. 377-378, 9/25/78).

2. Public Health Standards

Standards	Reference in Proposed Public Health Findings and Conclusions (Section IV.B.3)
a. Cal. Ambient Air Quality Std. 0.03 ppm (1 hr. average) Hydrogen Sulfide	Findings 6 & 7 on H_2S

b. California Department of Health, 17 CAC, Section 30355 Radon-222 (^{222}Rn) 100 pCi/l in air for controlled area; 3 pCi/l above natural background in uncontrolled area.	Findings 1-12 and Conclusions 1 & 3 Radionuclides
c. ARB Rule 1609 Sulfates 25 ug/m^3 (1 hr. average)	Findings 10 & 11 and Conclusion 3 on Ammonia, Ammonium Compounds and Sulfates
d. ARB Rule 160 Total Suspended Particulates (TSP) 60 ug/m^3 (Annual Geometric Mean) 100 ug/m^3 (24 hr. average)	Findings 3 & 4 and Conclusion 1 on TSP
e. ARB Rule 160 0.05 ppm (24 hr. average) Sulfur Dioxide; 0.5 ppm (1 hr. average)	Finding 2 and Conclusion 1 on SO_2

There are no enforceable standards for arsenic or boron. Therefore, public health impacts of Geysers Unit 17 emissions of these substances have been assessed in light of various proposed or recommended standards. See the proposed findings and conclusions, subsection 3, for treatment of these substances.

In addition to these public health standards Staff has pointed out the following standards applicable to worker safety <u>at</u> the site:

a. Cal OSHA 25 ppm (8 hr. average) Ammonia; Ammonium Compounds Cal OSHA 10 ppm for an 8 hour time-weighted average.	Finding 5 and Conclusion 1 on Ammonia, Ammonium Compounds and Sulfates Finding for H_2S
b. Cal OSHA 50 ug/m^3 (8 hr. average)	Findings 4 & 5 on Mercury

3. Proposed Findings and Conclusions

The Commission staff and PG&E have jointly proposed the following Findings and Conclusions on Public Health for Adoption by the Committee.

Findings - H_2S

1. Unit 17 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 0.030 ppm (1 hour average).

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

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

9. The impact of H_2S emissions from Unit 17 during normal power plant operation on ambient H_2S concentrations at receptors in The Geysers has not yet been determined to the satisfaction of the Energy Commission Staff and the Air Pollution Control District Officers.

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

11. Applicant has proposed to participate in a study which will develop sufficient data for an anlysis of the impacts of H_2S emissions from Unit 17 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.

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.

Findings - Radionuclides

1. The noncondensable 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 daughters 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 Unit 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 Unit 17 will be substantially different than the average ^{222}Rn content in the steam supply for Units 1-11.

7. The California standards for ^{222}Rn are 100 pCi/1 in air for a controlled area and 3pCi/1 in air, above natural background, in uncontrolled area.

8. PG&E will conduct annual testing of the steam of Unit 17 to verify that incoming concentrations of Radon 222 have remained below applicable standards.

9. "The resulting radioactivity will result from the scrubbing of radioactive particulates from ambient air."

10. "Wet cooling towers have shown a generic tendency to scrub particulates, including radioactive particulates from ambient air."

Conclusions

1. If ^{222}Rn content in the steam supply for Unit 17 is similar to that for Units 1-11, the resultant ambient concentrations from Unit 17 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 for Unit 17.

3. The Applicant shall dispose of the cooling tower sludge in an approved disposal site.

Findings - Ammonia, Ammonium Compounds, Sulfates

1. Unit 17 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).

4. Ammonia concentrations in steam from 61 producing wells at The Geysers has averaged 0.0194 percent by weight.

5. The Unit 17 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. Atmospheric reactions of ammonia emissions could potentially form toxic ammonium compounds, such as ammonium sulfate.

8. Sulfates can form through atmospheric oxidations of H_2S.

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

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

11. The ambient air quality standard for sulfates will not be exceeded as a result of normal power plant operation or the stacking of the steam supply for Unit 17.

12. Ambient temperatures and concentrations of precursors at The Geysers do not facilitate the formation of ammonium bisulfide.

Conclusions

1. Emissions of ammonia from the cooling tower and from the steam supply during periods of steam stacking will not result in adverse public health impacts.

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 will not be exceeded, adverse health impacts will not occur from sulfate formations resulting from operation of Unit 17.

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, an ambient standard of 1.0 ug/m^3 has been recommended pursuant to the Clean Air Act of 1970 as a National Emissions Standard for Hazardous Air Pollutants.

4. The mercury content in the steam supply for Unit 17 is expected to be similar to the mercury content in the steam supply for Unit 11.

5. Emission concentrations of mercury at the Unit 11 cooling tower point of exit were measured as 0.93 ug/m^3.

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.

8. Ambient mercury concentrations resulting from the addition of Unit 17 emissions at the cooling tower and at the steam release valve to present background concentrations will not exceed recommended standards.

9. Mercury cycles between land, water, air, plants, and animals.

10. Mercury in the food chain can adversely impact public health if present in sufficient quantities.

11. The addition of mercury from Unit 17 emissions to the food chain as a result of normal power plant operation and steam release valve during periods of steam stacking will not be significant.

Conclusions

1. Emissions of mercury during normal operation of Unit 17 and during periods of steam stacking will comply with recommended ambient standards for mercury and should not cause adverse public health impacts.

Findings - Arsenic

1. Unit 17 will emit some form of arsenic from the cooling tower 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 expected arsenic emissions from the cooling tower will be 3 lb/yr. Based on this annual emission rate, the expected concentration of arsenic at the cooling tower will be less than the suggested standards. With the addition of the effects of dilution and dispersion in the air, ambient arsenic concentrations from Unit 17 will be substantially below NIOSH suggested standards.

Conclusion

1. Available data indicates that arsenic emissions from Unit 17 and resulting ambient concentrations at The Geysers are well below the proposed standards designed to protect public health.

Findings - Boron

1. Boron is contained in the steam supply for Unit 17, and will be emitted from the cooling tower during normal power plant operation and from the steam release valve during periods of steam stacking.

2. Atmospheric reactions could result in the formation of boron compounds which can be toxic to humans.

3. There are no ambient air quality standards for boron or boron compounds, although the World Health Organization has recommended an ambient standard of 50 ug/m^3 for boric acid.

4. The expected boron emissions from the cooling tower will be 1500 lbs/yr. Based on this annual emission rate, the expected concentrations of boron at the cooling tower is such that the suggested WHO standards for boric acid would not be expected to be exceeded at the point of exit from the cooling tower.

5. Emissions of boron and resultant boron compounds would be dispersed and diluted during transport.

Conclusion

1. *Emissions of boron during normal power plant operation and during periods of steam stacking 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 of Unit 17 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, interefere 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.*

Findings - SO_2

1. *Atmoshperic 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 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 Unit 17 during normal power plant operation or during periods of steam stacking.

Conclusion

1. SO_2 resulting from operation of Unit 17 will not adversely affect public health.

4. Committee Findings and Conclusions

The Committee adopts the proposed findings and conclusions as set forth above for the Final Report.

The Preliminary Report contained findings on radionuclides as follows:

"9. The radionuclide ^{210}pb will be contained in the cooling tower sludge from Unit 17."

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

The Applicant proposed revisions to these two findings as follows:

"9. Radioactivity, including fallout and naturally occurring radionuclides, will be contained in the cooling tower sludge from Unit 17. The concentration of radioactivity in the sludge will be in the approximate range of concentrations found in soil of the general area." , and

"12. Because the radioactivity in the Unit 17 cooling tower sludge will be in the approximate range of concentrations in soils of the general area, disposal of this sludge in any disposal site will not adversely affect the public."

However, the Staff, in its written comments, objected to adoption of these new findings in the belief that the proposed amendments are not yet supported by information supplied by the Applicant. The Committee therefore, does not adopt the Applicant's proposed findings 9 & 12. We are directing the Applicant to supply the information necessary to support its proposed findings at or prior to filing the AFC should the Notice be approved.

The Applicant proposed two additional findings to replace finding 10 and 11 under the heading of "Radionuclides" in the Preliminary Report. The Staff did not object to these proposed amendments. Therefore, they have been adopted by the Committee and can be found as number 9 and 10 under "Radionuclides".

C. Safety and Reliability

1. Introduction

To further carry out the provisions of Public Resources Code Section 25511, that requires the Commission to "determine the adequacy of measures proposed by the applicant to protect public health and safety" the Committee must also "review the factors related to safety and reliability of the facilities" at the site. Among these factors are "special design features to account for seismic and other potential hazards". These features are covered under the heading of geotechnical and structural engineering issues.

2. Proposed Findings and Conclusions

The Commission staff and PG&E proposed the following Findings and Conclusions on geotechnical and structural engineering issues for adoption by the Committee.

Findings

1. A potential exists for damage to the power plant site due to gully erosion.

2. The Applicant has proposed to undertake certain short term and long range erosion control measures as specified on pages 113-118 of the NOI.

3. The Applicant stated (in a workshop held July 6, 1978) that it would employ additional mitigation measures of the types specified on Page III-61 and in Appendix A of a document entitled "Environmental Impact Report, Castle Rock Springs Geothermal Area," Atlantic Scientific Company, August 22, 1975.

4. Any breach of the berm containment surrounding the power plant site caused by gullying could be quickly and easily repaired.

5. A portion of the cooling tower structure will be located over a shear zone.

6. The rocks within the shear zone are weaker and less stable than rocks which are not located in the shear zone, and are thus susceptible to differential settlement, rebound, and related geological phenomena.

7. The depth of weathered shear zone materials extends to 20-30 feet below the present ground surface.

8. The Applicant has proposed to located the cooling tower foundation 45-60 feet below the present ground surface where it encounters shear zone materials.

9. The cooling tower foundation bearing pressure is approximately 1000 lbs/ft^2.

10. The bearing pressure of the rock and soil to be excavated is approximately 6000 lbs/ft^2.

11. The measures necessary to minimize hazards to the cooling tower foundation due to differential settlement, rebound, and related phenomena cannot be determined until the precise conditions encountered during excavation are known.

12. The Applicant has proposed to undertake mitigation measures appropriate to the actual conditions encountered during excavation. The mitigation measures include over excavation and placement of engineered fill or lean concrete, redesign of foundations, and pressurized injection of grout.

13. The Applicant has proposed to install survey markers in major foundations to monitor lateral and/or vertical movements.

14. The Applicant shall install survey markers when excavation reaches plant grade in order to monitor lateral and/or vertical movement which may occur prior to construction.

Conclusions

1. The Applicant shall undertake the erosion control measures specified in Findings 2 and 3.

2. With the implementation of erosion control measures as specified in Findings 2 and 3, the potential hazard to the power plant site due to gullying is minimal and acceptable.

3. The Applicant shall undertake the repair of any breach to the berm containment caused by gullying as soon as is feasible following the occurrence of such breach.

4. No adjudication of issues related to hazards to the power plant site caused by gullying is necessary during the NOI.

5. The Applicant shall undertake the measures specified in Findings 8, 12, 13, and 14.

6. With the implementation of the measures specified in Findings 8, 12, 13, and 14 the location of the cooling tower is acceptable from a geotechnical standpoint.

7. Adjudication of issues related to the location of the cooling tower over a shear zone is unnecessary during the NOI.

Findings - Seismic Performance Criteria and Design Methodology

1. *Applicant has proposed to design the Unit 17 power plant and related facilities to perform as follows:*

   a) *Consequences of a Maximum Probable Earthquake will be limited to structural damage repairable in one week or less. Most of the critical components and equipment will be repairable in the same period. Although seismic damage to large rotating equipment operating with close tolerances is difficult to predict, it is likely it can also be returned to service within this period. In any event, plant structures, components, and equipment will be repaired with due diligence using enlarged work forces and shift work.*

   b) *Consequences of a Maximum Credible Earthquake will be limited to a plant shutdown of twelve months or less without collapse of major structures and with minimal equipment malfunction or damage. Most of the critical components and equipment will be repairable in the same period. Although seismic damage to large rotating equipment operating with close tolerances is difficult to predict, it is likely it can also be returned to service within this period. In any event, plant structures, components, and equipment will be repaired with due diligence using enlarged work forces and shift work.*

2. *There are no adopted Energy Commission standards defining seismic performance criteria for Geysers Geothermal Power Plants.*

3. *Absent the adoption of seismic performance criteria for Geysers Geothermal Power Plants, the Applicant's seismic performance criteria appear adequate for this NOI.*

4. *A power plant or related facility component is critical if:*

a) it is necessary for continued power generation; and

b) replacement time is unacceptable; or

c) replacement cost is unacceptable.

5. *Applicant has proposed to design and construct critical structures using a base shear coefficient determined either by the ATC-3-05 design method with an effective ground acceleration of 0.4g or by the 1976 UBC, whichever is greater.*

6. *Generally, the base shear coefficients derived by the proposed ATC methodology will exceed those derived by UBC methodology.*

7. *Applicant has proposed to design non-critical structures to Uniform Building Code (1976 Edition).*

8. *Sonoma County requires structures within the County to be designed, at a minimum, to the Uniform Building Code.*

9. *Seismic design criteria for Geysers Geothermal Power Plants have not been adopted by the California Energy Commission.*

10. *Absent Energy Commission seismic design criteria for Geysers Geothermal Power Plants, the Applicant's proposed design methodology for critical structures is acceptable for this NOI.*

11. *Absent Energy Commission seismic design criteria for Geysers Geothermal Power Plants, the use of UBC for non-critical structures is acceptable for this NOI.*

12. *Applicant has proposed to ensure that critical facility components reasonably conform to the seismic performance criteria specified in Finding Number 1.*

13. *Applicant has proposed to designate which power plant and related facility components are critical and to justify such designations.*

Conclusions

1. Applicant shall design and construct Unit 17 and its related facilities to perform as specified in Finding Number 1.

2. Applicant shall design and construct critical facility structures as specified in Finding Number 5.

3. Applicant may design and construct non-critical facility components in accordance with the Uniform Building Code (1976 Edition).

4. Applicant shall ensure that critical facility components reasonably conform to the seismic performance criteria specified in Finding Number 1.

5. If the power plant and related facilities are designed and constructed as directed by Conclusions 1 through 4 the power plant and related facilities will conform to applicable seismic safety standards.

6. Applicant shall provide information as specified in Finding Number 13 at or prior to the filing of the AFC for Unit 17.

3. Committee Findings and Conclusions

The Committee adopts the proposed findings and conclusions as set forth above.

V. ISSUES REQUIRING FURTHER REVIEW

A. Introduction

The first key to identifying issues that may require further consideration in proceedings on PG&E's proposal to construct and operate Geysers Unit 17 lies in Findings and Conclusions presented in the foregoing sections. Several of these Findings and Conclusions reference information, studies, or reports that PG&E has agreed to provide prior to or at the time of filing the Application for Certification. The questions to which this additional information relates remain unanswered. The second basis for identifying issues that require further consideration are the statements made by various parties and the discussions that have ensued during the proceedings to date on the Notice, as described in Section III.B.

The following subsection sets forth the questions which the Committee plans to consider in making its recommendations on the Geysers Unit 17 Notice. In addition, information which the Committee expects to receive concerning each question is briefly described. In most cases, information required to resolve outstanding questions will not be available until PG&E files an AFC for Geysers Unit 17 (if the Commission approves the NOI).

Under these circumstances, and in the absence of new information presented at hearings on the Preliminary Report, the Committee has issued its Final Report based largely on information available as of the publication of the Preliminary Report. PG&E, various parties to the proceeding, and the public are therefore invited to state their views during hearings on the Final Report, as to whether or not the NOI for Geysers Unit 17 should be approved.

B. Issues and Information Requirements

1. Air Quality

With respect to issues of air quality, the two major questions are will Geysers Unit 17, during normal operations and in periods of steam stacking, comply with applicable H_2S emission's limitations? And, will Geysers Unit 17, 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 standard? PG&E is proposing to use a surface condenser and Stretford H_2S abatement system on Geysers Unit 17 to meet applicable H_2S emissions limitations.

Questions asked by various parties in this proceeding, that must be answered before these issues can be resolved, await the availability of certain information as described below:

a) Question: Is the Stretford system properly sized?

Information Required: Detailed information on design criteria and capacity of Stretford unit to be supplied by PG&E prior to or at the filing of the AFC for Unit 17. (See Air Quality Findings 7-8, Conclusion 2).

b) Question: Is the partitioning efficiency of the surface condenser high enough to eliminate the need for additional treatment of the steam condensate in order for Unit 17 to meet H_2S emissions limitations?

Information Required: Partitioning efficiency data from Unit 15 when available. The Applicant's specific proposal for condensate treatment systems that it believes will enable Unit to meet the H_2S emissions limitation of 100 grams/gross MWh should partitioning efficiency not equal 95-98% will be submitted with the AFC. (See Air Quality Findings 10-14, Conclusion 1).

c) Question: How will Unit 17 meet the 50 grams/gross MWh H_2S emission's limitation scheduled to go into effect on January 1, 1985, subject to review by the Northern Sonoma County APCD before January 1, 1984?

Information Required: PG&E has agreed to provide, prior to, or at the time the AFC for Unit 17 is filed, detailed information on alternative control methods that could be used to achieve the H_2S emissions limitation scheduled to take effect on January 1, 1985 (See Air Quality Finding 15, Conclusion 3).

d) Question: Do EPA Prevention of Significant Deterioration (PSD) regulations apply to Geysers Unit 17? If so, will Unit 17 comply with federal BACT requirements?

Information Required: Confirmation from EPA as to whether or not PSD applies. Resolution of question as to whether Unit 17 will comply with Northern Sonoma County APCD H_2S emissions limitations and confirmation that EPA will regard technology used to comply with Northern Sonoma County APCD rules as constituting BACT.

e) Question: Will Unit 17 comply with Northern Sonoma County APCD H_2S emissions limitations governing periods of steam stacking?

Information Required: Detailed information on control methods that will be used to comply with H_2S emissions limitations. PG&E will obtain this information from the steam supplier and provide it prior to or at the filing of the AFC for Unit 17 (See air quality Finding 27 and 28, Conclusion 6).

f) Question: Will federal PSD requirements apply to the steam suppliers' proposed methods of controlling H_2S emissions during periods of steam stacking? Will the proposed methods satisfy federal BACT requirements?

Information Required: Detailed information PG&E has agreed to obtain from the steam supplier on methods that will be employed to control H_2S emissions during periods of steam stacking. The information will be supplied prior to or at the time of filing the AFC (Air Quality Findings 28, 33, and 34 and Conclusion 5 and 8 and Committee Findings and Conclusions on Air Quality).

g) Question: Will Geysers Unit 17 prevent the attainment, interfere with the maintenance, or cause a violation of the ambient air quality standard for H_2S at sensitive receptors?

Information Required: An air quality analysis, using appropriate air quality and meteorological data, that considers the maximum impact of Geysers

Unit 17 H_2S concentrations at the point of sensitive receptors. If the analysis shows a violation, PG&E will perform a second analysis assuming compliance with Northern Sonoma County's rules and ARB's proposed standards limiting emissions from existing sources or those currently under construction, in January 1, 1985. PG&E will make the analysis available prior to or at the time of filing the AFC (See Air Quality Findings 41-48, 54, and 55, Conclusions 9-12).

h) Question: Will Geysers Units 3, 4, 5, 6, 11, and 12 comply with Northern Sonoma County APCD H_2S emissions limitations (Rule 455) at the time Geysers Unit 17 begins to operate?

Information Required: Detailed information on how Units 3, 4, 5, 6, 11, and 12 will comply with NSCAPCD Rule 455. PG&E will supply the information prior to or at the time of filing the AFC (See Air Quality Findings 50 and 51, Conclusion 13).

In addition to those issues identified in the Findings and Conclusions, various parties have raised the following questions:

a) Must the Commission find that Geysers Unit 17 will comply with Northern Sonoma County APCD emission's limitations during periods of steam stacking in order to certify the plant?

b) To what extent must Northern Sonoma County APCD consider Lake County APCD rules in issuing a permit to Geysers Unit 17?

c) Will Geysers Unit 17 comply with emissions limitations for TSP during steam stacking?

d) What constitutes BACT?

e) Should the Commission condition approval of the power plant to assure that it would not cause a public nuisance or excedence of national ambient air quality standards during a breakdown?

f) Will construction and operation of Geysers Unit 17 preclude further geothermal development in the Geysers?

g) Is PG&E's air quality model valid?

2. Soils

a. Question What is the design basis for the sedimentation basin? Is it adequate to assure that in combination with other mitigation measures PG&E has agreed to employ, that the short range erosion impact of Geysers Unit 17 will be modest, the long-range losses minimal and that the proposal will comply with applicable standards?

Information Required: Design specifics on the sedimentation basin. PG&E has agreed to address this issue in the AFC (See Soils Finding 4 and Conclusion 2).

3. Biological Resources

a. Question: What is the potential extent or significance of localized vegetation stress from Geysers Unit 17 cooling tower dr ft? What is the cumulative effect on vegetation of long-term, low-level exposure to cooling tower drift deposition? Should PG&E continue its existing study and or conduct additional studies in order to assess potential long-term chronic effects on vegetation from low-level exposure to low-level chronic toxicity from all steam and drift emissions resulting from geothemal development?

Information Required: The results of studies PG&E is currently conducting on cooling tower drift effects on vegetation. PG&E has provided an interim report on this study and will provide further reports and data prior to or at the filing of the AFC (See Biological Resources Findings 16-21, Conclusions 3 & 4).

4. Socio-Economics

a. Question: Will the Geysers Unit 17 project be compatible with local land use plans, goals and policies?

Information Required: Response from Lake County and Sonoma County to Commission communications requesting their comments and recommendations on this issue (See Socio-Economic Findings 9 & 10, Conclusion 4). Sonoma County's response is attached as an appendix. Lake County's has not yet been received.

b. Question: Will construction and operation of Geysers Unit 17 preclude further geothermal development in Lake County?

Information Required: Air quality analysis of the impacts of Geysers Unit 17 on H_2S ambient air quality. PG&E will provide the analysis prior to the filing of the AFC (See Socio-economics Finding and Conclusion 5 as proposed by Lake County).

5. Cultural Resources

a. Question: Do paleontological, historical, ethnographic, educational, scientific, or religious resources exist at the plant and steam field site? If so, what is their significance? Are mitigation measures necessary to protect them?

Information Required: A full cultural resource survey evaluating cultural resources. PG&E will provide a report based on this survey prior to or at the time of filing the AFC (See Cultural Resources Findings 4 and 5, Conclusions 2 and 3). The cultural resources report will be provided by December 1, 1978.

6. Structural Engineering

a. Question: Has PG&E properly designated these power plant and related components which will be designed to meet seismic performance criteria which Commission staff and PG&E agree should govern critical components?

Information Required: A designation and justification of critical power plant and related facilities components by PG&E. PG&E will supply this information at or prior to the filing of the AFC (See Structural Engineering Findings 1-13, Conclusions 1, 2, 4, 5, and 6).

7. Public Health [1/]

a. Question: What impacts will Geysers Unit 17 have on ambient H_2S concentrations at receptors in the Geysers during normal operations and periods of steam stacking?

Information Required: Results of PG&E's air quality analyses as described in air quality Findings 43-46. PG&E will provide this information prior to or at the filing of the AFC (See Public Health H_2S Findings 9-11).

1/ See also Air Quality questions relating to H_2S.

APPENDIX A

Timeline of Events

Hearing on Motion of City of Santa Rosa	July 18, 1978
Motion of City of Santa Rosa Denied	July 19, 1978
Informational Hearings, Santa Rosa and Lakeport	July 20, 21, 1978
Joint Prehearing Conference Statement Workshops	July 27, 28, 1978
Prehearing Conference, Santa Rosa and Kelseyville	August 10, 16, 1978
Prehearing Conference Order	August 29, 1978
Air Quality and Public Health Conference	September 25, 1978
Preliminary Report	October 20, 1978
Public Hearings, Preliminary Report, Lakeport and Santa Rosa	November 13, 1978
Written Comments	before November 20, 1978

Revised Proposed Schedule

Final Report	December 6, 1978
Public Hearings, Final Report	December 20, 1978
Decision	December 20, 1978

APPENDIX A - TIMELINE OF EVENTS

Proposed Schedule

On July 5, 1978, the Commission Committee issued the following schedule for the processing of the Geysers #17 NOI:

Receive NOI	May 25, 1978
Issue Workshops	July 6, 10, 13, & 14, 1978
Informational Hearings	July 20, 21, 1978
Prehearing Conference Statement Workshop	July 26, 27, 28, 1978
Prehearing Conference	August 7, 8, 1978
Prehearing Conference Order	August 15, 1978
Evidentiary Hearings	August 24 - September 5, 1978
Applicant's Findings	September 20, 1978
Counterfindings	September 30, 1978
Preliminary Report	October 6, 1978
Written comments	November 3, 1978
Final Report	November 20, 1978
Public Hearings	December 4, 1978
Decision	December 20, 1978

Actual Schedule

NOI Filed	May 25, 1978
Executive Director Accepted NOI	June 15, 1978
Commission Committee Appointed	June 15, 1978
Issue Workshops	July 6, 10, 13, 14, 1978

APPENDIX B

1. Schedule of Interventions

2. List of Intervenors

APPENDIX B - 1

SCHEDULE OF INTERVENTIONS

Intervenor	Petition Filed	Objection	Petition Granted	Hearing
Oakmont Property Owners Assoc.	January 25	None	June 7	
City of Santa Rosa	May 26		June 7	
Sonoma County	June 22	None	June 23	
Alpine Valley Property Owners Association	July 6	None	July 14	
State Department of Water Resources	August 2	August 9, PG&E	August 24	August 22
State Public Utilities Commission	August 3	None	August 16	
Lake County	August 4	None	August 24	
Lake County Air Pollution Control District	August 4	None	August 24	
State Air Resources Board	August 10	None	August 24	
Northern California Power Agency	September 12	September 25, PG&E	October 16	
Northern Sonoma County Air Pollution Control District	September 14	None	September 25	

APPENDIX B - 2

LIST OF INTERVENORS

Alpine Valley Property Owners
Association
c/o James A. Rundel
P.O. Box 1896
Santa Rosa, CA 95402

California Air Resources Board
Kingsley Macomber
Steven D. Burton
Kathleen Kahn
P.O. Box 2815
Sacramento, CA 95812

California Department of
Water Resources
J. Gary Steenhoek, Chief
Energy Division
P.O. Box 388
Sacramento, CA 95802

California Public Utilities Commission
Janice E. Kerr
William Foley
James S. Rood
5066 State Building
San Francisco, CA 94102

City of Santa Rosa
Derek J. Simmons
City Attorney
P.O. Box 1678
Santa Rosa, CA 95402

County of Lake
James T. Gordon
255 North Forbes Street
Lakeport, CA 95433

County of Sonoma
Office of County Counsel
Lynda Millspaugh
2555 Mendocino Avenue
Santa Rosa, CA 95401

Lake County Air Pollution
Control District
Fayne L. Tucker
255 North Forbes Street
Lakeport, CA 95453

Northern Sonoma County Air
Pollution Control District
Michael Tolmasoff
141 North Street
Healdsburg, CA

Oakmont Property Owners
Association
John Hastings, President
P. O. Box 2005
Santa Rosa, CA 95405

Northern California Power Agency
Martin McDonough, General Counsel
McDonough, Holland, Schwartz, & Allen
555 Capitol Mall, Suite 950
Sacramento, Ca 95814

APPENDIX C

Comments from Public Agencies

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

NOV 27 1978

STATE OF CALIFORNIA

78-NOI-3

State Energy Resources
Conservation and Development Commission

In the matter of: Notice of Intention of PACIFIC GAS AND ELECTRIC COMPANY to File an Application for Certification RE Geysers 17	Docket No. 78-NOI-3 STAFF COMMENTS ON THE PRELIMINARY REPORT.

The Staff of the California Energy Commission hereby submits its comments on the Preliminary Report, dated October 20, 1978.

Dated: 11/27/78

Respectfully submitted,

Stephen H. Burger

Stephen H. Burger
Matthew V. Brady
Attorneys for the Staff
of the California Energy
Commission

The Staff of the California Energy Commission submits the following comments to the Preliminary Report on the Pacific Gas and Electric Company's Notice of Intention to seek certification for Geysers Unit 17. Most of the comments are editorial and are offered to clarify the record. The Staff is concerned however, about the Committee's introduction to air quality findings and conclusions on pages 5 and 6. On those pages the Committee states that the Applicant must obtain regulatory authorization from the Northern Sonoma County Air Pollution Control Officer in order to construct Unit 17. This statement should be amended to reflect negotiations currently underway between representatives of the Commission and the Air Resources Board to establish a comprehensive power plant siting scheme that reflects the legislative mandates of both agencies. The following outline, taken from the Commission's Committee on Power Plant Siting Regulations November 1978 Policy Paper, is under discussion between the Commission and the ARB for inclusion in future Commission regulations and in a revised State Implementation Plan. Resolution of jurisdictional and administrative issues prior to the commencement of an AFC for Unit 17 is likely. The likelihood of resolution should be included in the Final Report in place of a statement that an NSCAPCD authorization is required.

A PROPOSAL FOR MEETING AIR QUALITY REQUIREMENTS IN THE POWER PLANT SITING PROCESS

In Part III of [the Policy Paper is a description of] how the Commission's siting authority should be implemented while taking account of the roles of other government agencies in the siting process. Although there are a variety of inter-governmental

relationships created by the Warren-Alquist Act, in general the following principles should apply to those relationships:

(1) Comments solicited from other agencies in the NOI should focus on the basic acceptability of the alternative proposals; in particular, they should tell whether any proposal has any obviously disqualifying aspect that would remove it from further consideration or make one alternative significantly less preferable than another.

(2) Analyses solicited from other agencies in the AFC should focus on whether, and the conditions under which, a specific proposal complies with the agencies' laws and standards.

(3) The Commission should rely heavily on the experience and expertise of other agencies; except for health and safety matters where no other agency has a comprehensive expertise, the role of the Staff should emphasize coordination and ensuring a complete record, rather than duplicating the analyses of other agencies.

(4) The findings and conclusions of another agency as to a project's compliance with the laws and standards which that agency normally enforces should be given great weight; they will be binding on the Commission unless clearly erroneous as a matter of law or fact or unless some serious consequence would result from their application.

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*/ Source: "Power Plant Siting Policy Paper", Committee on Power Plant Siting Regulations, CEC, November 1978, Appendix B.

AIR QUALITY REGULATORY OUTLINE

I. GENERAL PROVISIONS

A. This rule supersedes all state, local and regional rules, regulations, ordinances and standards.

B. Each local district shall be reimbursed for such added costs that are actually incurred by the district in complying with this rule.

II. NOI

A. Data Reqts: Sufficient detail for the analysis described below.

B. Procedure

1. Prior to the conclusion of the non adjudicatory hearings specified in PRC section 25509.5, the ARB and the local district in which a proposed facility may be sited shall submit a report containing preliminary recommendations on whether there is a reasonable likelihood of compliance with air quality regulations and on permit conditions to be applied to the facility.

2. If no site has a reasonable likelihood of compliance, the Commission Staff and the ARB shall propose alternative siting areas which merit further study to determine whether they may comply. The Applicant should be directed to study those proposed alternatives.

C. Decision

1. A site will only be approved if there is reasonable likelihood of compliance with air quality regulations;

provided however, that if the facility is needed and there is no site with a reasonable likelihood, it will approve the site that is most likely to comply.

2. In making determinations on air quality, the Commission shall give great weight to the views of the ARB and the local APCD's.

III. AFC

A. Data Requests

1. The requests shall be the same as for an authority to construct.

2. The APCD and ARB may request necessary information from the Applicant.

B. Procedure

1. Within 240 days of the filing date (a shorter period for the 12 month AFC's), the APCD shall submit findings and conclusions on whether the Applicant's proposal complies with applicable air quality regulations and what permit conditions should be imposed. If the proposal doesn't comply, the findings and conclusions shall include recommendations on conditions to be applied. These findings and conclusions shall be the result of the hearing procedure applicable to an authority to construct.

2. A witness in support of the findings and conclusions should be made available at the AFC hearings.

C. Decision

1. The findings and conclusions of the APCD shall be entitled to great weight and shall be binding on the Commission unless clearly erroneous as a matter of fact or law.
2. If there is disagreement between the APCD and the Commission on whether the proposal complies, the Commission Staff shall meet with the agency concerned to attempt to eliminate the inconsistences.
3. A similar meeting to eliminate noncompliance shall be held if the Commission finds that the proposed facility will not comply with air quality regulations. If the noncompliance cannot be eliminated, the Commission must make a written determination of whether the facility is required for the public convenience and necessity and whether there are any more prudent and feasible means of achieving such public convenience and necessity.
4. If there is an affirmative determination pursuant to paragraph 3 and the facility is certified, the following conditions shall be applied.
   a. The facility shall use BACT
   b. The Applicant shall undertake all actions determined to be technically and economically feasible and to be necessary to meet all applicable air quality regulation.
   c. The Applicant shall undertake all measures necessary to comply with federal air quality law.

5. A Commission certificate shall be in lieu of an authority to construct a permit to operate by the local district.
6. A facility shall not be certified by the Commission unless it meets the requirements of federal law.

D. Enforcement

1. The APCD and ARB shall have full authority to enforce compliance with any conditions and mitigation measures contained in the certification.

Following are Staff's suggested editorial changes to the Committee's Preliminary Report.

A. Air Quality

1. Page 23, item 4: delete "standard" and change "(gr/scf)" to "(gr/acf)";
2. Page 23, item 8: delete "ARB Rule 160" and add in its place "NSCAPCD";
3. Page 24, item 2: change "NSCAPGD Rule 420(a)" to "NSCAPCD Rule 420(d)";
4. Finding 18, page 28: delete "standard" and add "actual" in its place; change "scf" to "acf";
5. Finding 19, page 28: change "scf" to "acf";
6. Finding 31, page 30: change "Rule 420(a)" to "Rule 420(d)"; delete "standard"; change "scf" to "acf";
7. Finding 32, page 30; change "scf" to "acf".

B. Noise

1. Finding 3, page 38: change "Occupational Health and Safety Act of 1970" to "Occupational Safety and Health Act of 1970."

B97

C. Water Quality

1. Amendments proposed by Applicant at the November 13, 1978 hearing are acceptable; and

2. Add the following to Finding 5, page 42:

e. California Health and Safety Code section 25100;

f. 22 Cal. Administrative Code section 60001.

D. Soils

1. Applicant's proposed amendments are acceptable.

E. Public Health

1. Pages 57, item B(2)(a): change "ARB Rule 160" to "California Ambient Air Quality Standard."

2. Page 57, item B(2)(a): change "0.030 ppm" to "0.03 ppm."

3. Page 58, item B(2)(c) and (e): these standards should not be included in this section of public health standards. They are Cal OSHA standards which serve to protect worker health and do not apply to public health.

4. Page 58: change the first paragraph to read: "There are no enforceable ambient air quality standards for ammonia, mercury, arsenic or boron."

5. Findings 9-12, page 61; Applicants proposed amendments to numbers 9 and 12 are not, at this time, supported by information supplied by the Applicant. Proposed amendments to numbers 10 and 11 are acceptable.

6. Findings 3, page 64: change "oer" to "per" so the second line from the bottom reads: "suggests a standard of 2 ug/m^3 per 15 minute . . ."

Finally, on page 80, under item 5a, note that the cultural resources report will be provided by December 1, 1978.

78-NOI-3

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	)	
	)	Docket No. 78-NOI-3
	)	
Notice of Intention of Pacific Gas and Electric Company to File an Application for Certification Regarding Geysers 17	)	Comments of Northern California Power Agency Regarding the Preliminary Report

The Northern California Power Agency submits comments upon the following findings and conclusions contained in the Preliminary Report:

AIR QUALITY: Finding #14(a) page 27

It has come to the attention of NCPA that there will be a delay in the submission of information regarding the partitioning efficiency of the surface condenser in use at Unit #15. It was expected that this information would be available about 30 days after the unit start-up, scheduled for sometime during December of 1978. On November 17, 1978, PG&E stated this information would not be forthcoming until "sometime in 1979."

Since NCPA is relying upon such infromation to proceed with its Geothermal Project #2, and further, since the information is vital to a choice of the proper technology to allow full development of the Geysers resource area, NCPA would urge this Commission to investigate possibilities for assuring early production of data regarding Unit 15 condenser efficiency.

PROPOSED FINDINGS AND CONCLUSIONS ON SOCIO/ECONOMIC IMPACTS OFFERED BY LAKE COUNTY, ACCEPTED WITHOUT OBJECTION BY PG&E & CEC STAFF, AND ADOPTED BY THE COMMITTEE

FINDING #5, page 52

NCPA objects to adoption of this proposed finding. First, this finding states nothing more than conjecture; no factual basis adopted by this Commission exists, nor is contained in the Preliminary Report that would lead to the conclusion that operation of Unit 17 may preclude further geothermal development in Lake County. In this regard, proposed finding number 5 is inconsistent with item number 8 at page 52: "the proposed powerplant is located in an area whose principal land use is the exploration, development and utilization of geothermal energy and which has numerous geothermal powerplants in operation."

Respectfully submitted

Martin McDonough
General Counsel
Northern California Power Agency
555 Capitol Mall, Suite 950
Sacramento, CA 95814
Telephone: 916: 444-3900

Dated: November 20, 1978.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of: Notice of Intention of PACIFIC GAS AND ELECTRIC COMPANY to File an Application for Certification Re Geysers 17	DOCKET NO. 78-NOI-3

COMMENTS ON PRELIMINARY

REPORT

DAVID J. WILLIAMSON
Attorney for Applicant
PACIFIC GAS AND ELECTRIC COMPANY

DATED: November 20, 1978

D 104

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

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

Pacific Gas and Electric Company submits the following comments on the Preliminary Report, including technical corrections to certain of the Findings and Conclusions:

1. Section I.B.1. - Page 4, Paragraph 1

   The power plant will have a net normal operating capacity of approximately 110 mw. The turbine manufacturer has guaranteed a gross generating capacity of 120 mw. See Finding 2, page 26 of the Preliminary Report.

2. Section III.B.1. - Page 18, Paragraph 2

   Sentence two of this paragraph should begin as follows: "Non-attainment of federal ambient air quality standards . . . ." The requirements applicable for non-attainment of federal ambient standards are governed by EPA's regulations (40 C.F.R. 51).

3. Section III.B.1. - Page 19, Paragraph 1

A detailed new source review will be conducted by the NSCAPCD in accordance with Rule 230. (EPA has delegated new source review authority under the Clean Air Act to the NSCAPCD.) Therefore, PGandE suggests changing "The Committee must conduct a new source review" to "A new source review must be conducted."

4. Section III.B.2. - Page 19, Paragraph 1

Sentence two of this paragraph should be reworded as follows:

> "Pursuant to Northern Sonoma County APCD Rule 230(a) (New Source Review) and Rule 455 (emissions limitations, the APCO shall approve Geysers Unit 17 if it is determined that the proposed project will meet the emission limitations of Rule 455 and will not, in itself, cause a violation of or, in conjunction with existing sources, prevent attainment of ambient air quality standards."

A third sentence should be added as follows:
"If a facility cannot comply with Rule 230(a), a conditional approval under Rule 230(d) may be granted."

5. Section III.B.2 - Page 20, Paragraph 1

A threshhold requirement for the application of EPA's PSD regulations is the source's potential to emit more

than 250 tons per year of a pollutant regulated under the Clean Air Act. Although Geysers Unit 17 has the potential to emit more than 250 tons per year of H_2S, it is uncertain whether the PSD regulations apply to this facility. PGandE's letter of October 16, 1978, regarding the applicability to PSD regulations to Geysers Unit 17 has been forwarded to EPA's Division of Stationary Source Enforcement in Washington, D.C., for comment.

6. Section III.B.2. - Page 21, Paragraph 3, Final Sentence

The NSCAPCD position regarding the air quality impacts from the steam field is based upon data submitted at the time of the filing of the NOI. Since that time, stacking emission limits and procedures have changed. Union Oil has advised the NSCAPCD that the emission limits should be attainable by the time Unit 17 becomes operational. (See the attached letter from Warren Smith of Union Oil to Michael W. Tomalsoff, NSCAPCD.)

7. Section III.B.3. - Page 24, Rule 1

Rule No. 1 should read as follows:

"NSCAPCD Rule 455(b) Table II."

8. Section III.B.3. - Page 24, Paragraph 3

The NSCAPCD must consider the air quality in Lake County before issuing a permit according to Rule 220(b)(2).

9. Proposed Findings and Conclusions - Air Quality - Page 27
Findings 14a and 14b

It now appears the commercial operation date for Unit 15 will be delayed until early 1979.

10. Proposed Findings and Conclusions - Air Quality - Page 28
Finding 19

The emission rates that have been provided for particulate matter thus far have not included the emissions from the Stretford unit cooling tower, nor emissions from the power plant cooling tower if secondary treatment is required. The particulate emissions data are now being reviewed to reflect the condensate samples from the existing Unit 17 steam wells, as required by the NSCAPCD, and also to incorporate emissions from both the Stretford unit and from potential condensate treatment processes. When this review is completed, a revised emission rate will be provided to the NSCAPCD and to the Energy Commission. It is expected that the revised emission rate will be below the allowable emission rate.

11. Proposed Findings and Conclusions - Air Quality - Page 29
Finding 24

A PSD review for particulates could be required, depending upon EPA's calculation of "potential emissions" and on the type of treatment, if any, required for the Unit 17 condensate.

12. Proposed Findings and Conclusions - Air Quality - Page 29
Finding 26a

The word "not" should be deleted.

13. Proposed Findings and Conclusions - Water Quality - Page 42

The following revisions to Findings 2 and 5 should be made: Finding 2, first sentence - Delete the phrase "divided into." Finding 5, introductory phrase, should read: "The water quality standards potentially applicable to the project include:"

It should be noted that the water quality standards in Finding 5 are implemented through the NPDES permit system administered by the Regional Water Quality Control Board. Thus far, only the steam suppliers have been required to obtain NPDES permits.

14. Proposed Findings and Conclusions - Soils - Pages 45, 46

In order to distinguish between mitigation measures required for the power plant and the steam field, Finding 2, 3, and 4 should be revised as follows:

Following Finding 2a, insert the words "(steam field)."

Following Finding 2b, insert the words "(steam field and power plant)."

In Finding 3, replace the term "project" with "power plant."

Finding 3b, 3c, and 3d should be incorporated into a new Finding 4 reading as follows:

"4. The mitigation measures that will be utilized for the steam field to control soil loss and erosion are as follows:"

(a) (same as Finding 3b)

(b) (same as Finding 3c)

(c) (same as Finding 3d)

Finding 4 should be renumbered 5.

Conclusion 6 should be added as follows:

"6. Union Oil will implement the measures outlined in Finding 4a (which are equivalent to the measures in 4b) in order to comply with the permit conditions of Lake and Sonoma Counties. The North Coast Regional Water Quality Control Board requires implementation of Finding 4c as part of its discharge permit."

14. Proposed Findings and Conclusions - Public Health - Section IV.B.3. - Page 61

The following revision of Findings 9, 10, 11, and 12 should be made:

9. "Radioactivity, including fallout and naturally occurring radionuclides, will be contained in the cooling tower sludge from Unit 17. The concentration of radioactivity in the sludge will be in

the approximate range of concentrations found in soil of the general area."

10. "The resulting radioactivity will result from the scrubbing of radioactive particulates from ambient air."

11. "Wet cooling towers have shown a generic tendency to scrub particulates, including radioactive particulates from ambient air."

12. "Because the radioactivity in the Unit 17 cooling tower sludge will be in concentrations in the approximate range of concentrations in soils of the general area, disposal of this sludge in any disposal site will not adversely affect the public."

15. Proposed Findings and Conclusions - Section IV.B.3. - Public Health - Page 61

Conclusion 3 should be revised as follows: "The Applicant shall dispose of the cooling tower sludge in an approved disposal site." The sludge disposal site or classification should not be fixed.

16. Appendix C

PGandE would appreciate receiving copies of the state agency comments earlier in the NOI process.

Telephone (707) 542-9543

UNION 76

OCT 6 - '78

SITING DEPARTMENT

EEH	JGM
BJA	JES
JEH	JAW
HMH	JR

INFO PREPLY HANDLE
COMMENT SEE ME DEPT. FILE

Warren A. Smith
Environmental Engineer

October 4, 1978

Mr. M. W. Tolmasoff
Northern Sonoma County Air
Pollution Control District
141 North Main Street
Healdsburg, CA 95448

Re: Unit 17 Steam Supply Field
Compliance with Rule 455(b)

Dear Mr. Tolmasoff:

The following description is in response to your request to provide you with information concerning the techniques we intend to use in the Unit 17 steam supply system to comply with Rule 455(b).

The H_2S emission limits designated during drilling can be maintained using the caustic-peroxide abatement technique if required.

Plant stacking emission limits will be difficult to meet, but should be attainable by the time Unit 17 becomes operational. Unit 17 is expected to require approximately 1,900,000 pounds of steam per hour for normal operation. All wells serving Unit 17 with flow capacities in excess of 50,000 pounds per hour will be equipped with throttling devices which will enable reduction of flow to this unit in the range of 50 to 60% during short duration shut downs. This will reduce the steam vent rate to a range of 760,000 to 950,000 pounds per hour. The vent rate can be further reduced by 300,000 pounds per hour by utilizing the Unit 17-11 crossover; for a resultant stack rate reduction in the range of 66 to 76%.

Recent pilot tests conducted by Union have indicated that abatement as high as 50% may be obtained by applying a chemical abatement process to the plant stack. Successful development of this process could be utilized if necessary to reduce the

plant stack to a total abatement level of 83 to 88%.

Research and Development work is continuing on this process and other processes which may be more efficient and available for use prior to the projected start-up of the unit. A crossover between Unit 17 and Unit 12 is also being evaluated. This could provide additional plant stack reduction capability for longer duration shutdowns.

We will continue to supply you with reports of our progress in development abatement technology.

Very truly yours,

UNION OIL CO. OF CALIFORNIA

Warren A. Smith/dg

Warren A. Smith

WAS/dg
cc: J. Stuart Russell, PG&E

STATE OF CALIFORNIA

ENERGY RESOURCES CONSERVATION AND
DEVELOPMENT COMMISSION

78-NOI-3

In the Matter of:

Notice of Intention of PACIFIC GAS AND ELECTRIC COMPANY to File an Application for Certification Re Geysers 17.

DOCKET NO. 78-NOI-3

NOV 28 1978

NOTICE OF PUBLICATION AND DISTRIBUTION OF PRELIMINARY REPORT: NOTICE OF PUBLIC HEARINGS

The Energy Commission has issued a Preliminary Report in the above proceeding, and has invited comments from interested parties on or before November 20, 1978.

The staff of the CPUC (California Public Utilities Commission) has carefully reviewed the Proposed Report and has no comments thereon.

Respectfully submitted,

James S. Rood

Janice E. Kerr
William N. Foley
James S. Rood

Attorneys for the California Public Utilities Commission

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT

141 NORTH STREET, HEALDSBURG, CA. 95448

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

November 16, 1978

78-NOI-3

RECEIVED
NOV 21 1978
SUSANNE REED

ENERGY COMMISSION RECEIVED
NOV 22 1978

State of California
Energy Commission
1111 Howe Street, M.S. #15
Sacramento, CA 95825

ATTENTION: COMMISSIONER SUSANNE REED

SUBJECT: COMMENTS ON PRELIMINARY REPORT FOR GEYSERS UNIT 17 (78-NOI-3)

Dear Miss Reed:

Our comments will be restricted to Section III. B. In section III. B. 1. (pg. 18) a discussion of certain requirements in non-attainment areas is described, but no mention is made the Air Pollution Control Officer has the discretion to allow such construction under those conditions. In the same section (pg. 19) it is mentioned the "Committee" must conduct a new source review. It would be best all around if this is done in co-operation with this District since it may be troublesome if we had different conclusions when it come to issuing permits.

Section III. B. 2. (pg. 20) contains reference to use of BACT. This District strongly feels the H_2S emission limits set forth in Rule 455 are not BACT but are values arrived at via "roll-back" to achieve attainment. This District feels BACT would be closer to 8 gm/GMW-hr. and strongly feels it is achieveable (if you wish to explore this technically I would be willing to pursue this in another letter) and therefore disagree with section III. B. 4. (pg. 21). However, if this were the case, Pacific Gas and Electric Company would certainly opt for 39 gm/GMW-hr. which is below the new source review initiation trigger.

Lastly in section III. B. 3. (pg. 23 and pg. 24) and section III. B. 4. (pg. 28) of rule 420(d) is incorrect. The "scfm" (standard cubic feet per minute) should be a "acfm" (actual cubic feet per minute). Although this is not particularly important for the cooling tower it is extremely important for the steam transmission lines (this may be an insurmountable problem with respect to Lake County Air Pollution Control District's rule 411 on other NOI's).

If there are any other questions please contact our office at (707) 433-5911.

Sincerely,

Michael W Tolmasoff

MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MWT:lkm

AIR QUALITY EVALUATION — A/C — EVALUATION

MICHAEL TOMINSON
NORTHERN SONOMA COUNTY APCD

DATED: 11-16-78

COMPANY
PG&E
77 Beale Street
S.F., CA

78-NOI-3

ENERGY COMMISSION RECEIVED
NOV 16 1978

EQUIPMENT DESCRIPTION

APPLICATION 78-29

UNIT NO. 17 GEOTHERMAL POWER GENERATING SYSTEM CONSISTING OF:

1. STEAM TURBINE, 120 GROSS MEGAWATTS
2. STEAM CONDENSER, DIRECT CONTACT TYPE
3. NON-CONDENSABLE GAS EJECTOR SYSTEM
4. COOLING TOWER, CROSS-FLOW, EVAPORATIVE TYPE, DESIGNED AIR FLOW OF 14,960,000 SCFM

TO BE LOCATED AT (need location description, UTM co-ord.)

BACKGROUND

The proposed unit no. 17 will be part of the expansion plan for geothermal development by PG&E and Union Oil Co.. Presently units 1-11 are in operation with additional units expected (see attached "Recommended Schedule of Resource Additions for 1978-1987").

Presently, a number of units (3, 4, 5, 6 and 11) are using $Fe_2(SO_4)_3$ catalyst for H_2S control, but this method is not too effective (40%-70% control). Currently PG&E is attempting to use hydrogen peroxide to aid the iron catalyst to achieve 90% abatement. PG&E engineering staff has assured this District they have been achieving 95% abatement for three weeks continuous at unit no. 11 and are now optimizing it to 1) determine feed rates and 2) develop proper automation techniques to implement the H_2O_2 system.

According to the variance schedule for PG&E units 3, 4, 5, 6 and 11 they would be 90% abated for H_2S emissions. Units no. 12, 14 and 15 within a year should be achieving approximately 100 gm/hr./GMW-hr. See attached Figure I for estimated total emissions projected for the future based on current NSCAPCD rules and regulations.

PG&E's variance no. 77-6 requires certain abatement as well as special H_2S abatement research (see attached Appendix "A").

RECOMMENDED SCHEDULE OF RESOURCE ADDITIONS
ECR 1978-1982

ZA (117)

YEAR	IDENTIFICATION	TYPE OF RESOURCE (1)	DRY YEAR AUGUST MEGAWATTS	NORMAL OPERATING CAPACITY (2)	MONTH
1978	CANADIAN ENTITLEMENT CHANGE	P	-100		JANUARY
	OAKLAND 3	GT	54	57	JUNE
	OAKLAND 1	GT	54	57	JULY
	OAKLAND 2	GT	54	57	AUGUST
	⊙ GEYSERS 12	G	106		OCTOBER
	DIABLO CANYON 1 (3)	N	1060		NOVEMBER
	⊙ GEYSERS 15	G	55		DECEMBER
1979	COLEMAN, EXISTING PLANT SHUTDOWN	H	-3	-13	APRIL
	DIABLO CANYON 2 (3)	N	1060		MAY
	⊙ GEYSERS 14	G	110		JUNE
	INSKIP, EXISTING PLANT SHUTDOWN	H	-2	-6	JUNE
	COLEMAN, NEW PLANT ON LINE	H	5	12	JULY
	SOUTH, EXISTING PLANT SHUTDOWN	H	-3	-4	AUGUST
	INSKIP, NEW PLANT ON LINE	H	3	7	SEPTEMBER
	⊙ GEYSERS 13	G	135		OCTOBER
	DIABLO CANYON 1 RERATE (3)	N	40		NOVEMBER
	SOUTH, NEW PLANT ON LINE	H	3	7	NOVEMBER
	VOLTA, EXISTING PLANT SHUTDOWN	H	-4	-7	NOVEMBER
1980	N.I.D.: ROLLINS	H	5	11	FEBRUARY
	VOLTA, NEW PLANT ON LINE	H	5	6	FEBRUARY
	DIABLO CANYON 2 RERATE (3)	N	40		MAY
	POTRERO 7 (GT PORTION)	CC	272	300	JULY
	RETIRE POTRERO 1 (4)	F	-58		OCTOBER
	RETIRE POTRERO 2 (4)	F	-58		OCTOBER
1981	HELMS PUMPED STORAGE	PS	1120	1125	JUNE
	MAAS INCREASE	H	15		JUNE
	POTRERO 7 (STEAM PORTION AND RERATE)	CC	106	100	JULY
	⊙ GEYSERS 16 *	G	110		OCTOBER
	⊙ GEYSERS 17	G	110		OCTOBER
1982	USBR: NEW MELONES	H	119		JANUARY
	USBR: NORTHWEST POWER	P	-400		JANUARY
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE
	PITTSBURG 8&9 (GT PORTION)	CC	576	600	JULY
	DIABLO CANYON 1 RERATE (3)	N	20		NOVEMBER
	DIABLO CANYON 2 RERATE (3)	N	50		NOVEMBER
	KERCKHOFF 2	H	151	160	DECEMBER
	KERCKHOFF DERATING	H	-38		DECEMBER
1983	OROVILLE RETURN	H	309	374	APRIL
	SMUD: GAS TURBINES	GT	150		APRIL
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE
	PITTSBURG 8&9 (STEAM PORTION AND RERATE)	CC	200		JULY
	⊙ GEYSERS 18 (6)	G	110		AUGUST
	⊙ GEYSERS 19 (6)	G	110		SEPTEMBER
1984	PITTSBURG 8&9 (GT PORTION)	CC	576	600	JUNE
	⊙ GEYSERS 20 (6)	G	110		JUNE
	⊙ GEYSERS 21 (6)	G	110		JUNE
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE
1985	PITTSBURG 8&9 (STEAM PORTION AND RERATE)	CC	200		JUNE
	⊙ GEOTHERMAL (22) (6)	G	110		JUNE
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE
	FOSSIL 1	F	800		NOVEMBER
1986	USBR: AUBURN	H	87		JANUARY
	⊙ GEOTHERMAL (23) (6)	G	110		JUNE
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE
	FOSSIL 2	F	800		NOVEMBER
1987	USBR: AUBURN INCREASE	H	48		JANUARY
	⊙ GEOTHERMAL (24) (6)	G	110		JUNE
	UNIDENTIFIED COGENERATION (5)	CG	50		JUNE

NOTE: STANISLAUS AND SAN JOAQUIN NUCLEAR PROJECTS ARE NOT INCLUDED IN THIS PROGRAM, BUT ARE BEING CONSIDERED FOR OPERATION BEYOND 1987.

(1) H-HYDRO, F-FOSSIL STEAM, N-NUCLEAR, G-GEOTHERMAL, GT-GAS TURBINE, CC-COMBINED CYCLE, PS-PUMPED STORAGE, P-PURCHASE, CG-COGENERATION.
(2) SHOWN ONLY WHEN DIFFERENT THAN AUGUST RATING.
(3) DATE DEPENDENT UPON TIME OF ISSUANCE OF OPERATING LICENSE BY N.R.C.
(4) SCHEDULE IS RELATED TO CONSTRUCTION OF POTRERO 7.
(5) COGENERATION INCLUDES NOT ONLY THE PRODUCTION OF ELECTRICITY AS AN INDUSTRIAL BY PRODUCT, BUT ALSO SUCH NON-COGENERATION SOURCES AS SOLID WASTES (MUNICIPAL, AGRICULTURAL AND WOOD), WIND, AND SMALL PURCHASES OF ON-SITE GENERATION.
(6) GEOTHERMAL RESERVOIR ACREAGE IS PROVEN THROUGH UNIT 17 ONLY. SCHEDULE OF FUTURE UNITS IS DEPENDENT UPON SUCCESSFUL EXPLORATORY DRILLING.

*Geysers Unit 16 has been rescheduled to start operation in September 1982
Geysers Unit 17 has been rescheduled to start operation in June 1982

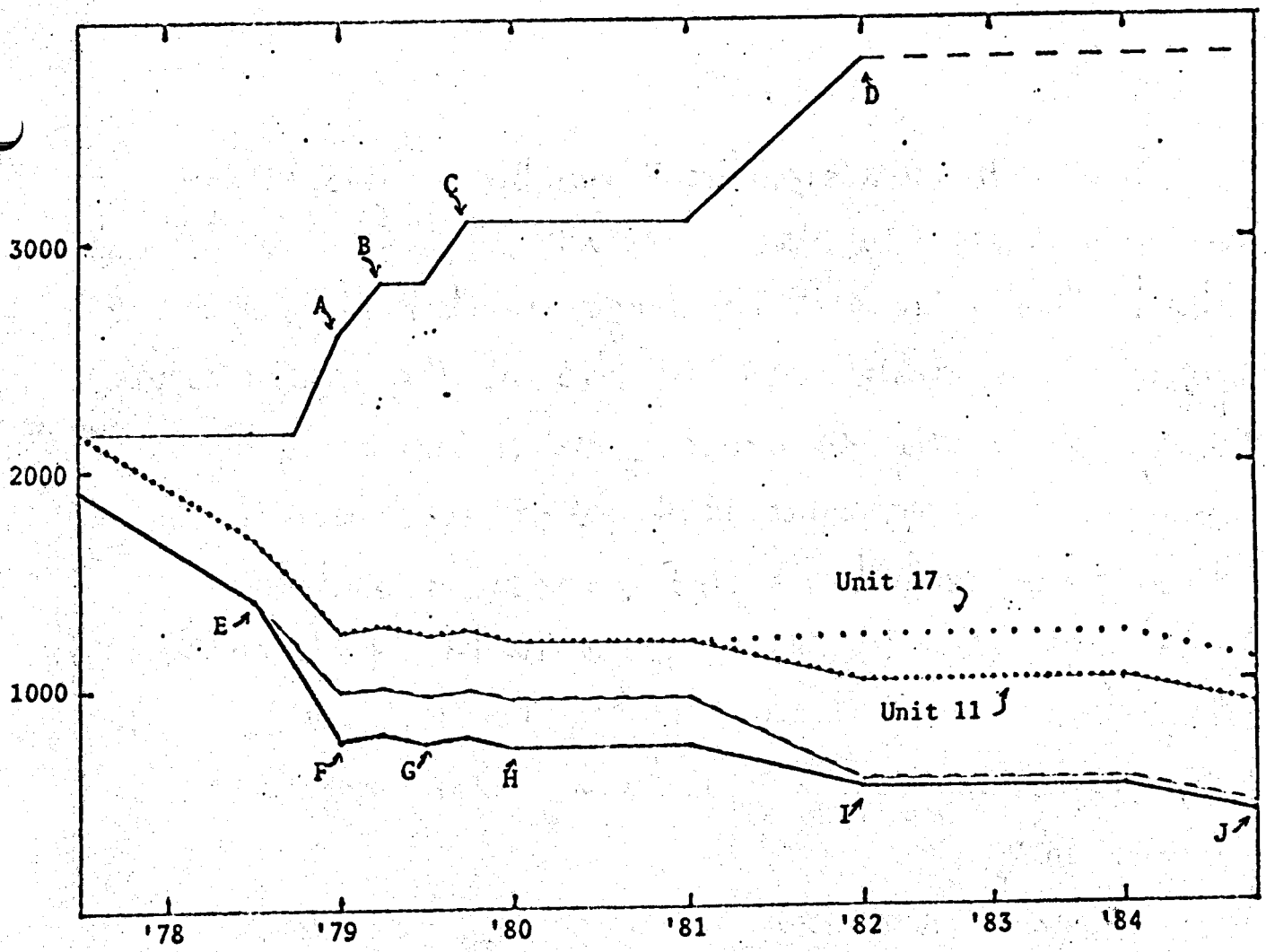


FIGURE 1: SONOMA COUNTY GEOTHERMAL FIELD EMISSIONS (EXPECTED) BASED ON MAY 1978, NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT GEOTHERMAL REGULATIONS.

——— MAXIMUM H_2S GENERATED (NO ABATEMENT)
····· WORST CASE STEAM STACKING (ONE PLANT)
– – – – STEAM STACKING WITH DISTRICT REGULATIONS
——— NORMAL EMISSIONS (FULL CAPACITY)

A - UNIT 15 ON LINE
B - UNIT 12 ON LINE
C - UNIT 14 ON LINE
D - UNIT 17 + NCPA/SHELL ON LINE
E - 50% ABATEMENT UNITS 3 & 4 AND 5 & 6
F - 90% ABATEMENT UNITS 3 & 4, 5 & 6 AND 11
G - WELL TESTING AND WORKING
H - WELL DRILLING AND UNIT 15 REDUCTION
I - 200 g/GMW - UNITS 1 & 2, 7 & 8 AND 9 & 10
J - 50 g/GMW - ALL NEWER UNITS

Since 1971-73 a significant number of H_2S related odor complaints have been received by LCAPCD. It was about this time that a large number of geothermal power plants started emitting H_2S in the 1000-1400 #/hr. range. Undoubtly the cause of the H_2S odors is the Geysers. However, since 1974 PG&E has been continually trying to control the H_2S emissions and have met with very limited success until of later. By the end of 1978 it is anticipated PG&E will be emitting 700-800 lb./hr., hopefully reducing odor problems significantly.

In addition an air quality study in the Kelseyville area is underway to determine its relative impact and the impact of existing geothermal units. It may be that lower elevation emitters are major contributors to odor complaints and H_2S ambient air quality standard exceeds.

AIR CONTAMINANTS

The air contaminants involving this proposed power plant are H_2S and particulate. As such the following rules may be applicable: 220, 230, 400, 410, 420 430 and 455. In addition the prevention of significant deterioration (PSD) will be discussed.

Rules 490 (Federal New Source Performance Standards) and 412 (National Emission Std. for Hazardous Air Cont...) are not applicable to this equipment.

EVALUATION

A. RULES 220 & 230 [NEW SOURCE REVIEW]: PARTICULATE - Based on PG&E's estimate of "drift" rate, drift water solids content and water circulating rate the particulate emission rate could be:

$$80{,}160{,}000 \frac{\text{lbs } H_2O}{\text{hr}} \times .00015 \frac{\text{lb. part.}}{\text{lb. } H_2O} \times .00002 \frac{\text{lbs lost}}{\text{lb } H_2O} =$$

$$.24 \frac{\text{lb}}{\text{hr}} = 5.8 \frac{\text{lb}}{\text{day}} = 1.05 \frac{\text{ton}}{\text{year}}$$

(.11 kg/hr) (2.6 kg/day) (962 kg/yr)

Even if the estimate was off by a factor of 10 the new source review "trigger" levels would not be reached for particulate. No evaluation appears necessary although PG&E's estimates need some substantiation.

B. RULES 220 & 230: H_2S - The following emission rates for this source are:

$$2{,}000{,}000 \frac{\text{lb } H_2O}{\text{hr.}} \times \frac{450 \text{ to } 250 \text{ lb } H_2S}{1{,}000{,}000 \text{ lb } H_2O} = 900 \text{ to } 500 \frac{\text{lbs } H_2S}{\text{hr.}}$$

$$500\text{-}900 \frac{\text{lb } H_2S}{\text{hr}} = 12000 - 21600 \frac{\text{lb } H_2S}{\text{day}} = 2190 - 3942 \frac{\text{ton } H_2S}{\text{year}}$$

$$(227\text{-}409 \frac{\text{kg}}{\text{hr}}) \quad (5448 - 9818 \frac{\text{kg}}{\text{hr}})$$

The applicant claims they will achieve 100gm/hr/Grossmegawatt-hr which is

$$120 \text{ MW-hr} \times 100 = 12 \text{ kg/hr}$$

$$= 26.4 \frac{\text{lb } H_2S}{\text{hr}} = 633 \frac{\text{lb } H_2S}{\text{day}} = 115 \frac{\text{ton}}{\text{year}}$$

$$(12 \text{ kg/hr}) \quad (287 \text{ kg/day})$$

Since the emission rates are in excess of 25 lb/hr or 250 lb/day then Rules 220 and 230 apply. [In order for NSR not to apply, an emission rate of 10.4 lb/hr or 39 gm/hr/GMW-hr would have to be achieved].

The District has reviewed PG&E's dispersion analysis and has found it inadequate on the following grounds 1) analysis has not included all emission sources; 2) Gaussian dispersion analysis has not been verified in the area and 3) there is no thorough understanding of the H_2S transport mechanism to explain the H_2S exceeds at various sensative receptor sites [therefore, knowing what to model for is a problem].

C. RULE 400 (NUISANCE)- As discussed in the "Background" section a considerable number of odor complaints currently exists. However, will the current emissions be the same when Unit 17 comes on line? It is anticipated that H_2S emissions generated at the Geysers will be reduced to the 700-800 lbs/hr range where most of the reduction will have occured from the lower elevated units 3, 4, 5 and 6. It is believed this will be most effective in eliminating odor complaints. The inclusion of U. 17 emissions should not add significantly but an air analysis is warranted.

D. RULE 410 (OPACITY)- From experience the emissions from the cooling tower never result in any visible particulate opacity problems.

E RULE 420 d (PARTICULATE EMISSIONS LIMIT)- The operation can not exceed 0.20 grain/SCF or 40 lbs/hr.

(1) $\underset{H_2O}{\text{CIRCULATING}} \times \text{TOTAL SOLIDS} \times \text{DRIFT}$

$$\frac{16000\,GAL}{MIN} \times \frac{60\,MIN}{HR} \times \frac{8.35\,LB}{GAL}{}^{H_2O} \times .00015 \frac{LB\ P.}{LB\ H_2O} \times .0002 = 0.24 \frac{LB\ P.}{HR}$$

(2) $$\frac{0.24\,LB}{HR} \times \frac{7000\,GRAINS}{LB} \times \frac{HR}{60\,MIN} \div (14{,}960{,}000\,SCFM) = .000002 \frac{GR}{SCF}$$

Even if the estimates are off by a factor of 10 compliance appears very probable.

F. RULE 430 (FUGITIVE DUSTS) - From experience the emissions from fugitive dusts should not result in a violation. The initial construction period holds the greatest potential but can be easily resolved by watering the various roads properly.

G. RULE 455 a (1000 ppm SO_2) - There are two points of potential sulfur emissions; 1) the cooling tower and 2) the off-gas ejector. For the cooling tower, assuming no H_2S control, the H_2S conc. would be:

$$\frac{900 \text{ LBS } H_2S}{\text{HR}} \times \frac{\text{LB-MOL } H_2S}{34 \text{ LB}} \times \frac{379 \text{ CF}}{\text{LB-MOL } H_2S} \times \frac{\text{HR}}{60 \text{ MIN}} \div (14{,}960{,}000 \text{ SCFM}) = .00011$$

$\cong$ 110 ppm

It is unlikely this would occur except under breakdown conditions, but compliance is unavoidable.

For the non-condensables stream the concentration should reach over 1,000 ppm H_2S, however, the applicant has not provided a gas analysis of the expected non-condensables. Therefore, additional information as to the gas composition should be obtained. Also no application has been received for the air pollution control device to control the non-condensable's H_2S.

If one assumes the Stretford is to be used then compliance with the 1,000 ppm will be achievable, however it would be worth investigating the effect of CO_2 on the Stretford solution.

H. RULE 455a (100 gm/hr./GMW) - The applicant has no application for non-condensable gas scrubber, but assuming they use the Stretford then compliance may be possible. The heart of the problem to achieve the 100 gm/hr./GMW (26.4 lb/hr. for a 120 mega-watt unit) is the "partitioning" of the H_2S to split out of the condensate at the condenser tubes in the turbine-condenser. If insufficient H_2S splits out then the balance in the condensate must be treated. The District has seen sufficient evidence to indicate H_2S can be treated in water to less than 1 ppm used hydrogen peroxide (H_2O_2)*; however, this has not been demonstrated at the Geysers to date.

CONCLUSIONS AND RECOMMENDATIONS

See the table below:

RULE	COMPLIANCE POSSIBLE	COMPLIANCE NOT POSSIBLE	ADD. INFO. NEEDED
220, 230 {PARTICULATE}	X		
220, 230 {H_2S}			X
400	X		X
410	X		
420 d	X		
430	X		
455 a	X		X
455 b	X		X

* See Appendix "B"

Recommend additional information, Issuing of conditionation authority to construct possible on all rules except rules 220 and 230.

AIWT
10/10/78

EXHIBIT "A"

PG&E

VARIANCE

NO.

77-6

RESOLUTION NO. 77-6

DATED: May 1, 1978

RESOLUTION OF THE HEARING BOARD OF THE NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT MAKING FINDINGS AND DECISION ON PETITION OF PACIFIC GAS AND ELECTRIC COMPANY FOR AN EXTENDED VARIANCE

WHEREAS, due notice having been given as required by law, petition for an extended variance has come before this Board as follows:

PETITIONER: PACIFIC GAS AND ELECTRIC COMPANY
DATE AND TIME OF HEARING: MAY 1, 1978, 9:30 A.M.
CODES AND REGULATIONS VIOLATED OR EXPECTED TO BE VIOLATED WITHOUT AN EXTENDED VARIANCE: RULE 455(a) OF THE RULES AND REGULATIONS OF THE NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT.

WHEREAS, petitioner appeared, testimony was taken and the matter submitted.

NOW, THEREFORE, BE IT RESOLVED that this board finds:

1. Pacific Gas and Electric Company is in violation of District Rule 455(a).
2. Due to conditions beyond the reasonable control of Pacific Gas and Electric Company, requiring compliance would result in the practical closing and elimination of a lawful business.
3. Such closing would be without a corresponding benefit in reducing air contaminants.
4. Evidence indicates that the iron catalyst abatement scheme for the present variance makes achieving the requirements of Rule 455(a) technically difficult and economically burdensome.
5. An upstream H_2S reduction process shows 1) an excellent chance of producing superior H_2S reduction efficiency, 2) would solve other H_2S emission problems associated with steam venting during power plant outages and 3) promises to be economically feasible. Furthermore, Pacific Gas and Electric Company has already committed itself to research to determine this processes' viability by September, 1979.
6. Pacific Gas and Electric Company realizes the upstream abatement scheme may prove to be unfeasible and will therefore continue certain engineering design on the iron catalyst abatement system so as to expedite its installation if need be.

7. During certain meteorological conditions the granting of this variance may cause the State Ambient Air Quality Standard for H_2S to be violated unless certain interim measures of abatement are undertaken.

BE IT FURTHER RESOLVED, that the decisions of this board are as follows:

1. Pacific Gas and Electric Company shall achieve the variance increments of progress on or before the achievement dates as set forth in Exhibit "A" and the conditions that follow.
2. Pacific Gas and Electric Company shall modify units 3, 4, 5, 6 and 11 at the Geysers in such a manner as to make each unit capable of abating H_2S emissions by 90%. Modification shall be complete and in operation on or before December 31, 1978.
3. Pacific Gas and Electric Company shall report every three months to the Air Pollution Control Officers of Northern Sonoma County and Lake County, the Hearing Board and other interested parties as to its progress on all aspects of the attached schedule (Exhibit "A") of hydrogen sulfide abatement at the Geysers. Such reports shall be in such a form and shall contain such information as is requested in writing at least 30 days in advance by the Air Pollution Control Officer of Northern Sonoma County.
4. Pacific Gas and Electric Company shall take any and all necessary steps to see that vendors, contractors and subcontractors are actively engaged in meeting delivery and performance deadlines. These steps may include, but are not limited to: charging penalties for late deliveries, paying premiums to insure special delivery, or maintaining contact with the vendor, contractors and subcontractors to assure proper performance.
5. Commencing June 1, 1978, and until 90% H_2S reduction is achieved at units 3, 4, 5, 6, and 11, Pacific Gas and Electric Company shall operate at the request of the Control Officer, an H_2S abatement system capable of at least 50% abatement at units 2, 8, 9 and 10 during periods, as determined by the Control Officer when concentrations of H_2S at sensative r ceptor sites exceed or are predicted by the Control Officer to exceed the H_2S Ambient Air Quality Standards. Once the 90% H_2S reduction is achieved at units 3, 4, 5, 6 and 11, the Control Officer can only request the abatement of units 2, 8, 9 and 10 during June through October of each year the variance is effective. Procedures to implement such periodic operation shall be agreed upon in writing by Applicant and the Control Officer by May 15, of each year.
6. At the completion of the upstream pilot test on unit 7, the periodic abatement as indicated in paragraph 5 shall be reviewed and reconsidered to include unit 7.

7. Pacific Gas and Electric Company shall use its best efforts to devise, by May 15, of each year a methodology acceptable to the Control Officer for prediction of the excessive concentrations of H_2S based on meterology and any other relevant data. If a methodology acceptable to the Control Officer is devised, it shall be incorporated in the procedures referred to in paragraph 5 above.

7a). Pacific Gas and Electric Company shall develop the proposed strategy of this paragraph on or before October 1, 1978. Pacific Gas and Electric Company should critically evaluate all existing SRI data relative to cross-ridge transport and other mechanisms which could result in the degrading of Lake County air quality. The extent of the computer analysis and the statistical parameters tested should be agreed upon by the Air Pollution Control Officer.

7b). If a competent consultant can be hired and meteorology does not preclude a valid tracer test, Pacific Gas and Electric Company shall test whether or not the emissions from the interim abated plants do reach SRI station 1, 2, 3, 4, 5, 6 and 7, using tracer or comparable techniques. At the written request of the Air Pollution Control Officer, Pacific Gas and Electric Company should include tracer sampling points other than at the SRI station cited above but not to exceed 20 sampling sites.
If after a statistically valid series of tests are conduced, the results are negative, the Control Officer will issue in writing a partial or complete discontinuation of interim abatement under specified meteorological conditions.

8. Pacific Gas and Electric Company shall prepare a development program by June 1, 1978, for an improved H_2S source test method or device designed to measure emissions associated with goethermal power plants. The purpose of this method or device will be to determine compliance with applicable H_2S source emission standards. This program shall include the use of consultants for a sum not to exceed $75,000.00, which includes a consultant to develop a problem approach. Any consultant shall be approved by the Air Pollution Control Officer and all information developed by the consultant shall be provided to the Air Pollution Control Officer.

9. Pacific Gas and Electric Company shall source test any unit to determine compliance with the variance at the written request of the Control Officer. The request shall be reasonable and consider operational problems of Pacific Gas and Electric Company.

* For the purpose of this document 90% abatement shall mean that H_2S emissions will not exceed 10% of the calculated total throughput of H_2S during plant operation at 100% capacity.

Member

Buys Aye Perry Aye Young Aye Keith Aye VanderWeken Absent

Ayes 4 Noes _____ Abstain _____ Absent 1

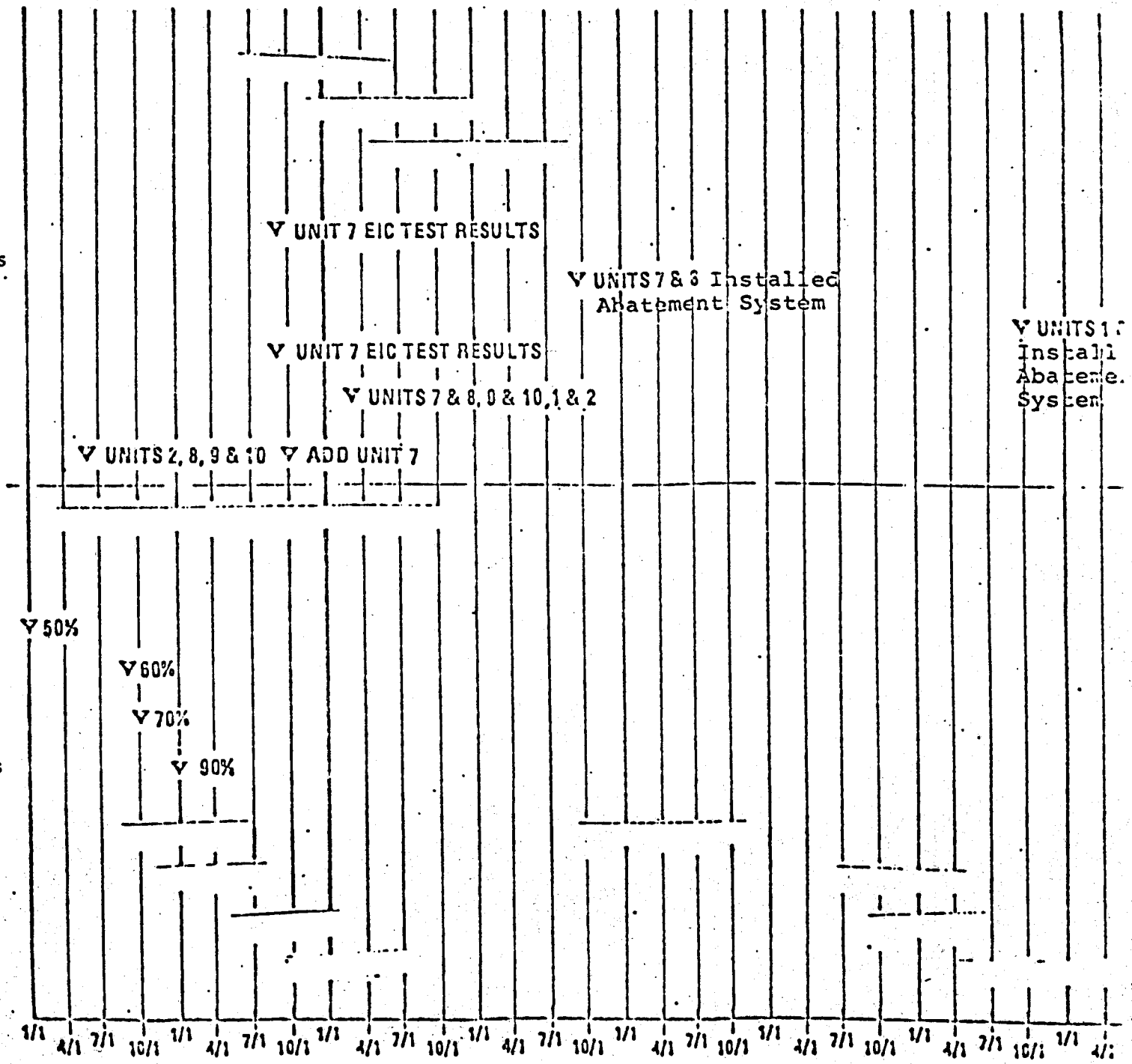
SO ORDERED.

EXHIBIT "A"

GEYSERS SCHEDULING

Variance Increments of Progress

1. PG&E-Variance Schedule If "EIC" process proves feasable
2. PG&E-Variance Schedule If "EIC" process not feasable
3. Periodic Abatement
4. PG&E Research and Development Abatement Goals, units 3 & 4, 5 & 6, 11
5. H_2S reduction at units 3, 4, 5, 6 and 11 achieved



Appendix "B"

H_2O_2 oxidizing potential for H_2S

101554
Hydrogen Peroxide Solves Sulfide Odor Problem
Hutchinson, Kenneth A.
Ind. Wastes 23(1):26-27, Jan./Feb. 1977
Doc Type: J; Original (Field)
CAS Registry No: 7783-06-4

Injecting hydrogen peroxide into artesian springs on the floor of a limestone quarry cleminated odors from hydrogen sulfide (H2S). Such problems are common in many areas where water contains high levels of H2S. The problem centered around natural artesian springs which flow into the quarry. Artesian water and surface water are channeled to a collection well, then pumped to a holding pond near the top of the quarry. About 10 to 12 million gal are pumped from the quarry weekly. The artesian spring waters contain 30 to 80 ppm H2S. As housing developments approached the quarry, citizen complaints began. Homeowners complained of the odor during hot, hazy weather. Hydrogen peroxide controls hydrogen sulfide odor by oxidizing dissolved H2S. Tests were run to determine the proper application rate and injection points. Optimum injection rates were 150 ml/min at the main water source and 100 ml/min at the collection well. Sulfide ion concentration in the collection well dropped from 30 ppm to a fractional ppm after treatment. Odor in the quarry dropped dramatically. The system consists of tanks to store hydrogen peroxide, metering systems, and tubing to carry the chemical. The odor control system, installed in November 1975, has performed without a hitch. Since hydrogen peroxide decomposes into oxygen and water, the reaction creates no harmful pollutants.

Descriptors: Public Affairs; Complaints; Pollutants; Odorous Pollutants; Residential Areas; Sources; Non-Industrial Emission Sources (NEC); Water Bodies; Water Pollution; Stationary Emission Sources; Industrial Emission Sources; Manufacturing Industries; Stone, Clay, Glass, and Concrete Production; Atmospheric Phenomena; Meteorology; Condensation (Atmospheric); Haze; Temperature (Atmospheric); Sulfur Compounds; Sulfides; Hydrogen Sulfide; Weekly

Category: Control Methods (Categorical); Control Methods (Specific Stationary Source)

084036
CHEMICAL WASHING - AN EFFICIENT ODOR ABATEMENT SYSTEM FOR HERRING OIL AND HERRING MEAL FACTORIES.
Skogland, Ivar and Christian Vlig
(Kjemisk vask - et rimelig og effktivt luktreduksjonssystem for slidolje- og sildemelfabrikkene). Text in Norwegian. Tidsskr. Kjemi, Bergvesen., Met., 35(9):21-23, Dec. 1975.
TIDSSKR KJEMI BERGVESEN MET 1975
TECH Method of Support: NONE
Languages: NORWEGIAN

Chemical scrubbing of malodorous waste gases emitted by herring oil extraction and herring meal production plants in Norway is described in the light of recent experimental results. The malodorous emissions contain various compounds with very low odor thresholds, such as ammonia, triethylamine, indole, hydrogen sulfide, methylmercaptan, dimethylsulfide, propanol, acetone, actolein, and butyric acid. Potassium permanganate, sodium hypochlorite, and hydrogen peroxide are theoretically suitable for the chemical deodorization of these malodorous waste gases in spray scrubbers. Hydrogen peroxide is often unsuitable due to its low reaction rate, while the use of potassium permanganate is restricted due to its high price and to the formation of solid reaction products which tend to clog the scrubber. Therefore, sodium hypochlorite is recommended for the deodorization. Correct dosage of the chemical and pH control are important for high efficiency.

Descriptors: ODOROUS POLLUTANTS; POLLUTANTS; NORWAY; EUROPE; SCANDINAVIA; WESTERN EUROPE; SPRAY TOWERS; CONTROL EQUIPMENT-GAS STREAMS; SCRUBBERS; ODOR CONTROL; CONTROL METHODS; FISH MEAL PRODUCTION; FAT AND OIL PRODUCTION; FOOD AND KINDRED PRODUCTS INDUSTRY; INDUSTRIAL EMISSION SOURCES; MANUFACTURING INDUSTRIES; RENDERING PLANTS, GREASE AND TALLOW; SOURCES; STATIONARY EMISSION SOURCES

Category: CONTROL METHODS

082464
DECENTRALIZE YO R ODOR CONTROL.
Water Sewage Works, 121(10): 60-62, Oct. 1974.
WATER SEWAGE WORKS 1974
FLD Method of Support: NONE

A hydrogen peroxide system for the control of odors in the Sunrise, Florida, wastewater collection system is described. The odor is caused by hydrogen sulfide, a frequent by-product of waste collection and treatment systems. It can be dangerously toxic. In a sewer environment, H2S is often converted into sulfuric acid which erodes the collection and treatment system. The City of Sunrise waste collection system consists of gravity mains, lift stations, and force mains. Hydrogen peroxide is injected into the collection system at lift stations ahead of where the problem is first detected. The dose of hydrogen peroxide is adjusted to overcome the odor problem at the lift station and to prevent it from recurring. The H2S and its odor were eliminated at the three lift stations.

Descriptors: ODOROUS POLLUTANTS; POLLUTANTS; FLORIDA; AMERICA; NORTH AMERICA; UNITED STATES; ODOR COUNTERACTION; CONTROL METHODS; ODOR CONTROL; SEWAGE TREATMENT; ELECTRIC, GAS, AND SANITARY SERVICES; INDUSTRIAL EMISSION SOURCES; SANITARY SERVICES; SEWERAGE SYSTEMS; SOURCES; STATIONARY EMISSION SOURCES; SULFURIC ACID; ACIDS; INORGANIC ACIDS; HYDROGEN SULFIDE; SULFIDES; SULFUR COMPOUNDS; FLORIDA

Identifiers: SUNRISE

Category: CONTROL METHODS

0133

0120299 *77-002658
KINETICS AND MECHANISM OF OXIDATION OF HYDROGEN SULFIDE BY HYDROGEN PEROXIDE IN ACIDIC SOLUTION,
HOFFMAN MICHAEL R.
UNIV OF MINNESOTA,
ENV SCIENCE & TECHNOLOGY, JAN 77, V11, N1, P61 (6)
RESEARCH REPORT: THE KINETICS OF OXIDATION OF HYDROGEN SULFIDE AND HYDROSULFIDE ION TO SULFUR AND SULFATE IN AQUEOUS SOLUTION BY HYDROGEN PEROXIDE ARE DETERMINED POTENTIOMETRICALLY. UNDER PROPER CONDITIONS H 20 2 APPEARS TO BE AN EFFECTIVE REAGENT FOR CONTROL OF H 2S AND ITS ODOR IN AQUEOUS SYSTEMS. H 20 2 IS ADVANTAGEOUS OVER OTHER OXIDIZING AGENTS BECAUSE ITS DECOMPOSITION PRODUCTS ARE SIMPLY OXYGEN AND WATER. AS A LIQUID, H 20 2 IS READILY AND QUICKLY APPLICABLE. NO TOXIC OR CORROSIVE FUMES ARE EMITTED, AND IT IS ECONOMICALLY COMPETITIVE. (7 GRAPHS, 28 REFERENCES, 4 TABLES)
DESCRIPTORS: *HYDROGEN PEROXIDE ; *HYDROGEN SULFIDE ; *WATER ODORS ; *OXIDATION ; *SEWERS ; *POTENTIOMETRY
REVIEW CLASSIFICATION: 19

0115133 *76-006230
HYDROGEN PEROXIDE SOLVES SLUDGE ODOR PROBLEM,
MILLER ROBERT G.
APPELTON PUBLIC WORKS DEPT, WIS,
WATER & SEWAGE WORKS, MAY 76, V123, N5, P74 (3)
TECHNICAL FEATURE: THE USE OF HYDROGEN PEROXIDE TREATMENT TO SOLVE AN EXTREME HYDROGEN SULFIDE ODOR PROBLEM IN THE SLUDGE DEWATERING PROCESS AT APPLETON, WIS., IS DESCRIBED. WITH AN ANNUAL COST OF $9800, THE PROCESS ENSURES A COMFORTABLE WORKING ENVIRONMENT AND BETTER COMMUNITY RELATIONS. (1 DIAGRAM, 5 PHOTOS)
DESCRIPTORS: *HYDROGEN PEROXIDE ; *WATER ODORS ; *SLUDGE DEWATERING ; *WISCONSIN ; *HYDROGEN SULFIDE
REVIEW CLASSIFICATION: 01

0113986 76-005259
ODOR CONTROL WITH HYDROGEN PEROXIDE,
COLE, CHARLES A. ; PAUL PAUL E.; BREWER HAROLD P.
PENNSYLVANIA STATE UNIV,
WPCF J, FEB 76, V48, N2, P297 (10)
TECHNICAL REPORT: HYDROGEN PEROXIDE IS USED TO TREAT HERSHEY, PA., WASTEWATER PLANT EFFLUENT AT TWO LOCATIONS-THE FEED TO THE FLOTATOR-CLARIFIER AND THE FEED TO THE INTERMEDIATE CLARIFIER. A COMBINED DOSE OF FROM 15-40 MG/L HYDROGEN PEROXIDE EFFECTIVELY CONTROLS HYDROGEN SULFIDE AND RESULTING ODORS. (2 DIAGRAMS, 3 GRAPHS, 3 TABLES)
DESCRIPTORS: *HYDROGEN SULFIDE ; *WASTEWATER TREATMENT ; *HYDROGEN PEROXIDE ; *WATER ODORS ; PENNSYLVANIA
REVIEW CLASSIFICATION: 19

0111712 *76-003071
HYDROGEN PEROXIDE SOLVES HYDROGEN SULFIDE PROBLEM,
LINDSTROM STEPHEN R.
HAMPTON ROADS SANITATION DISTRICT, VA,
POLLUTION ENGINEERING, OCT 75, V7, N10, P40 (2)
TECHNICAL FEATURE: SEVERAL TYPES OF BACTERIA PRODUCE HYDROGEN SULFIDE GAS FROM ORGANIC MATTER IN SEWAGE UNDER ANAEROBIC CONDITIONS. H2S HAS A VERY FOUL ODOR, IS POTENTIALLY A HEALTH HAZARD TO PERSONNEL, AND CAN COMBINE TO FORM SULFURIC ACID IN THE SEWAGE. CHLORINATION, ONE OF THE MOST COMMON METHODS OF H2S CONTROL, IS UNSUCCESSFUL IN CERTAIN SITUATIONS. INTRODUCTION OF HYDROGEN PEROXIDE AT A CONCENTRATION AS LOW AS 15.3 PPM PROVED EFFECTIVE IN CONTROLLING H2S IN TWO VIRGINIA SEWAGE TREATMENT PLANTS. (1 DIAGRAM, 1 TABLE)
DESCRIPTORS: *HYDROGEN SULFIDE ; *HYDROGEN PEROXIDE ; *ODORS ; SEWAGE TREATMENT ; CHLORINATION ; ANAEROBIC SYSTEMS ; VIRGINIA
REVIEW CLASSIFICATION: 01

0105787 75-005686
THE CHEMICAL CONTROL OF WASTEWATER SULFIDES,
RALEIGH CHARLES W.
FMC CORP, NJ,
DEEDS & DATA-WPCF, JAN 75, P1 (3)
TECHNICAL FEATURE: APPROXIMATELY 60 MUNICIPAL AND INDUSTRIAL WASTE TREATMENT PLANTS IN THE U.S. ARE USING HYDROGEN PEROXIDE TO CONTROL SULFUR CHEMICAL WASTES. APPLICATION OF H202 TO SULFIDE ODOR AND CORROSION CONTROL IN WASTEWATER COLLECTION SYSTEMS IS DESCRIBED. (1 TABLE)
DESCRIPTORS: *SULFIDES ; *HYDROGEN PEROXIDE ; *WATER ODORS ; *CORROSION ; *WASTEWATER TREATMENT ; *CHEMICAL TREATMENT ; *HYDROGEN SULFIDE
REVIEW CLASSIFICATION: 19

0105027 75-004943
PEROXIDE MAKERS SNIFF SUCCESS IN WASTE TREATMENT,
CHEMICAL WEEK, JAN 15, 75, V116, N3, P26 (1)
TECHNICAL FEATURE: SINCE CHLORINE IS UNDER ATTACK BECAUSE OF ITS ALLEGED ROLE IN THE FORMATION OF CARCINOGENS IN SOME DOMESTIC DRINKING WATERS, HYDROGEN PEROXIDE PRODUCERS HOPE THE CHEMICAL WILL SUPPLANT CHLORINE AS THE WORKHORSE FOR WASTE TREATMENT. THE FMC CORP. AND DU PONT DE NEMOURS & CO. ARE BETTING THE MARKET FOR WASTE TREATMENT HYDROGEN PEROXIDE WILL EXCEED THAT FOR PULP AND PAPER. (1 PHOTO)
DESCRIPTORS: *HYDROGEN PEROXIDE ; *WASTE TREATMENT ; *CHLORINE ; *ODORS ; *HYDROGEN SULFIDE ; *281 INORGANIC CHEMICALS
REVIEW CLASSIFICATION: 19

B135

NORTHERN SONOMA COUNTY AIR POLLUTION CONTROL DISTRICT

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

OCTOBER 10, 1978

PACIFIC GAS AND ELECTRIC CO.
77 BEALE STREET
SAN FRANCISCO, CA

ATTENTION: ELMER HALL

SUBJECT: DISPOSITION OF APPLICATION NO. 78-29
CONSISTING OF: GEOTHERMAL POWER PLANT NO. 17
120 MEGAWATT GROSS CAPACITY

TO BE
LOCATED AT: GEYSERS, CALIF.

Dear MR. HALL,

Your Application for an Authority to Construct or a Permit to Operate for the above described equipment has been reviewed by the District and the findings are as follows:

Your Application # 78-29 was received on SEPTEMBER 12, 1978

☐ The Application is complete. A decision by the District will be made within 180 days.

☒ This project is subject to 'new source review' which requires notification procedures in addition to the approval of this project. All decisions made relative to this Application in regards to 'new source review' are subject to review and/or reversal by the State Air Resources Board and the Environmental Protection Agency.

☒ The Application is not complete. The following data will be needed to complete the Application process:

- ☐ Equipment location drawing (including adjacent property or pollutant receptors).
- ☐ Operating schedule.
- ☐ Process description.

F136

☐ Flow Diagram.

☒ Ambient air quality data for DETERMING H_2S IMPACT ON ACHIEVING 0.03 PPM H_2S AMBIENT AIR QUALITY STANDARD (SEE ATTACHMENT "A")

☐ Meteorological data: _____

☒ The Items required are marked in red pencil on the enclosed form "B".

☐ _____

_____

☐ The Application was received without the appropriate fee. Before the District can proceed, please remit to the District $_____ For the initial fee (schedule_____ step).

Submission of the requested items by FEBRUARY, 19 79, will expedite the processing of your Application.

If you have any questions about these findings, please contact the District at (707) 433-5911.

Sincerely,

Michael W. Tolmasoff

MICHAEL W. TOLMASOFF
Air Pollution Control Officer

MW:1km

ENCLOSURES

MEMO
FORM "A"

DATE: 10/10/78

TO: E.E. HALL

FROM: M.W. TOLMASOFF, AIR POLLUTION CONTROL OFFICER

SUBJECT: DATA FOR NEW SOURCE REVIEW RULES 220 AND 230 : UNIT 17

UNDER NORMAL CIRCUMSTANCES MOST AIR QUALITY IMPACTS CAN BE ASSESSED USING THE GAUSSIAN DISPERSION MODELLING. HOWEVER, YOUR UNIT NO. 17 IS NOT IN A TYPICAL SITUATION AND IS IN A HIGHLY COMPLEX TERRAIN AREA. COUPLED WITH THE HIGH H_2S EMISSION POTENTIAL AND ITS PROXIMITY TO COBB VALLEY RESIDENCES THE DISTRICT FEELS A "TRACER" EFFORT IS THE ONLY GOOD WAY TO DETERMINE 1) WHETHER U.17 CAN REASONABLE NOT "PREVENT THE ATTAINMENT" OF THE STATE H_2S AMBIENT AIR QUALITY STANDARD AND 2) WHETHER CERTAIN NUMERIC MODELS ARE APPLICABLE.

TO THIS END PG&E HAS ENTERED INTO A TRACER STUDY EFFORT APPROVED BY THE DISTRICT.* THEREFORE, PRIOR TO THIS DISTRICT ISSUING A CONDITIONAL AUTHORITY TO CONSTRUCT PG&E MUST PRESENT THE RESULTS OF THE STUDY ANSWERING THE BASIC QUESTIONS FOUND IN RULE 230(a)(1).

Michael W. Tolmasoff

* A COPY OF THE TRACER STUDY PROGRAM CAN BE PROVIDED UPON REQUEST

FORM "B"

PART A

All applications for permits (authorities) to construct new or modified air sources are subject to the requirements of this portion of the list.

I. Name

A. Business license name

B. Nature of business

C. Name, address, and phone number of person to contact regarding this application

D. Type of use entitlement (own, rent, lease)

E. Estimated construction dates and estimated completion dates

II. Type of Application

A. 1. Original application

2. Revised application

B. 1. New facility

2. Modification

3. Existing facility not previously permitted

III. Description of Facility

A. Location

1. Street address of facility (or location as described by section, township, and range)

2. Scaled and dimensioned plot plan of facility which shows and identifies the locations of:

a) Public and private streets

b) Property lines

c) Existing and proposed buildings (indicate their heights)

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d) Adjacent property owners ~~and uses~~ WITH IN COBB VALLEY VICINITY

e) Storage areas for fuel, materials and products

f) Basic, control, and air monitoring equipment

g) Piping and ducts for carrying fuels, products, and possible sources of air pollutants

h) Identify points of emissions

B. Describe the general purpose of this facility

IV. Description of Process - TO THE EXTENT PRACTICAL (AS DETERMINED BY DEQ/LRAPA) THE APPLICANT SHALL PROVIDE:

A. General description of each process line

B. For facilities with more than one process line:

1. Submit a block flow diagram which shows the interaction between each process line (include a material balance and a description of the material processed as it changes in terms of maximum design rates)

2. Submit a drawing which shows the transfer of materials, products, and possible sources of air pollutants between process lines, buildings, and storage areas

C. Basic and control equipment descriptions (e.g., make, function, model, size, type, maximum capacity, Hp)

D. Operating schedule (No. of hours/day, days/week, weeks/year)

E. Maximum monthly, hourly, and daily production rates and raw material useage rates

F. Total average annual production rates and raw material useage rates (such as tons/year)

F140

G. Provide the following information associated with each piece of basic (existing, modified, and proposed) equipment:

1. Equipment identification number
2. Inlet and outlet temperatures
3. Identify the emission points and state to where the equipment is to be vented
4. The material entering and leaving the equipment
5. The energy consumption, (e.g., Btu/hr, KW/hr)
6. State whether the operation is continuous or intermittent **

NO APPLICATIONS FOR AUTHORITY TO CONSTRUCT RECEIVED.

H. Describe control equipment and attach calculations and detail drawings. Provide the following information associated with each piece of control equipment (existing and proposed):

1. Schematic and description of overall control equipment *
2. Control equipment identification number
3. Inlet and outlet concentrations { INCLUDE ALL NON-CONDENSABLES / INCLUDE DISSOLVED SOLIDS FOR U.17
4. Control efficiency; verify source of data (e.g. calculations, manufacturer's specifications, source test) { EXPLAIN HOW CO_2 WILL EFFECT EFFICIENCY OF STRETFORD
5. Identify the points of emission associated with each piece of equipment
6. For particulate matter, include data on the size distribution and chemical nature of emissions
7. Energy consumption (e.g., Btu/hr, KWH/hr)

NOT GEYSERS "ACREAGE"

* a) MONITORING EQUIPMENT
b) PROVISIONS FOR MONITORING FOR A.P.C. EQUIPMENT AND MEANS TO CONTINUE ABATEMENT IF EQUIPMENT ITEM FAILS (I.E. PUMP, LINE PLUG, RESERVE CHEMICALS)
c) DETERMINATION OF COMPLIANCE WITH RULE 455 B.

** DESCRIBE PROCEDURES TO REDUCE LENGTH OF BREAKDOWN TIME AND TO DETERMINE OCCURRENCE THEREOF.

I. Describe locations and amounts of emissions (in terms of maximum design rates)

1. Identify points of emission
2. Height of the outlet above ground level
3. Size and shape of the outlet, (e.g. 9" round)
4. Flow rate of exhaust gases
5. Outlet temperature
6. Estimate the quantity of each pollutant emitted: total suspended particulates, carbon monoxide, organic gases, nitrogen oxides, and sulfur oxides, as examples

J. Describe emissions of a fugitive nature, i.e., not included in "I" above

K. Attach copies of all calculations used in answering the previous questions (also cite references and tolerance of data)

V. Fuel Burning Equipment and Fuel

A. Describe burners

1. Equipment identification number, manufacturer's name and model, size, number of burners, minimum and maximum ratings per burner, and burner type.
2. The burner mode of control, (e.g. manual, automatic on-off, high-low) if applicable.
3. Air compressor data (if air atomization is used): manufacturer's name and mode, drive motor horsepower, compressor rating (pressure and capacity), and operating pressure.
4. Firing type, (e.g. tangential, opposed, front).
5. Type of fuels and the percentage of combustion air.

F1-2

PART B

When a source is subject to new source review, an applicant supply the following in addition to the information required by Part A.

I. Information required for air quality impact analysis

A. Any monitoring stations that may be installed by applicant

B. Sufficient data to perform an impact analysis from all emission points and fugitive emissions:

1. Meteorological data
2. Topographical data
3. Air quality data
4. Computer modeling data, including assumptions that should be made

} SEE FORM "A"

II. Identify all facilities within the air basin that are owned or operated by the applicant and the compliance status of each.

III. Power Consumption of facility

A. Total amount of electrical power to be consumed by the new facility or the increase in the amount of electrical power to be consumed due to the modification.

B. Percentage of electrical power provided by off-site generating facilities; identify the source of power.

IV. Cargo Carriers

List the frequency of visits, describe types and sizes of all cargo carriers (other than motor vehicles), identify nature of cargo, and conditions under which the cargo is transfered.

V. If applicant is applying for trade-offs from other existing source:

A. Provide sufficient information to determine whether adequate emission

reductions will be achieved to offset the air quality impacts of the applicant's source (e.g., name and location of trade-off sources and of how the emission trade-offs will be affected).

VI. List proposed mitigating measures:

A. Air pollution control equipment proposed

(B.) Process changes or operations utilized to reduce emissions *

C. Other

*A) PROVISIONS TO MINIMIZE BREAKDOWN OF STRETFORD EQUIPMENT.

B) PROVIDE LITERATURE INDICATING B.A.C.T. IN REGARDS TO USING H_2O_2 TO REDUCE DISSOLVED H_2S TO LESS THAN 1 P.P.M.

APPENDIX D

Public Comments

No comments were received.

F

APPENDIX E

Proposed Decision

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	
Notice of Intention of PACIFIC GAS AND ELECTRIC COMPANY to File an Application for Certification Re Geysers 17.	Docket No. 78-NOI-3 PROPOSED DECISION

On December 6, 1978, the Committee assigned to this proceeding issued its Final Report pursuant to Public Resources Code section 25514. Public Hearings were held before the Commission on December 20, 1978 in Sacramento. After considering the comments made at that hearing as well as written comments, the Commission approves the Notice of Intention and adopts the Committee's findings and conclusions in the Final Report.

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, Applicant has shown that the proposed project can be constructed and operated in conformance with presently applicable federal, state, regional, or local standards, ordinances, and laws, with the exception of applicable air quality laws and regulations.

There is not sufficient evidence in the record to make a definitive finding regarding conformity to air quality laws and regulations. The evidence presently in the record does not support a finding that the proposed project cannot conform to applicable air quality laws and standards.

Further studies and reports on air quality have been ordered by the Committee for submission with the Application for Certification.

3. The proposed project conforms to the applicable public health and safety laws and regulations. The state ambient air quality standard for hydrogen

sulfide (H_2S) of 0.030 ppm is based on a nuisance odor threshold. As stated above, further studies and reports are being conducted regarding conformity to hydrogen sulfide air quality standards. There is not sufficient data regarding adverse public health effects from chronic exposure to hydrogen sulfide to conclude that operation of this plant will cause adverse public health effects. The Commission will continue to explore this issue in the course of the AFC proceedings.

The Commission orders that the following acts be done, together with those other acts enumerated in the findings and conclusions of the Final Report:

Air Quality

1. If the Applicant files an AFC for Unit 17, it shall include either:
   a) sufficient operating data on the surface condenser partitioning efficiency from Unit 15 to determine with reasonable certainty that Unit 17 will meet the 100 g/MWh H_2S limitation without condensate treatment, or
   b) specific proposals for condensate treatment systems which will be installed prior to the commercial operation of Unit 17 in the event that the partitioning efficiency of the condenser is not sufficient to meet the 100 grams/GMWh limitations.

2. The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the design criteria and capacity of the Stretford unit as proposed to treat that H_2S which reaches the unit.

3. The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the control methods that would be employed to comply with the 50 g/MWh emissions limitation of NSCAPCD Rule 455(b), scheduled to take effect January 1, 1985.

4. The Applicant shall, at or prior to the time an AFC for Unit 17 is filed, obtain and provide from the steam supplier detailed information on the control methods which would be employed to comply with the H_2S stacking emissions limitations of NSCAPCD Rule 455(b), scheduled to take effect January 1, 1982.

5. The Applicant shall perform the air quality analyses described in Findings 43, 44, and 45 (New Source Review) of the Final Report, and shall provide the results of such analyses at the filing of the AFC for Unit 17.

6. The Applicant shall participate in the joint air quality and meteorological study described in Finding 46 (New Source Review) of the Final Report, and shall provide the available results applicable to Unit 17 at the filing of the AFC for Unit 17.

7. The Applicant shall, at or prior to the filing of an AFC for Unit 17, provide detailed information on the control methods which will be employed on Units 3,4,5,6,11, and 12 to comply with the emissions limitations of NSCAPCD Rule 455.

Soils

The Applicant shall address in the AFC the design specifics of the sedimentation basin.

Biological Resources

The Applicant shall provide the Staff a report on the studies and make available for inspection the data it has collected regarding the effects of cooling tower drift deposition at or prior to the filing of the AFC.

Cultural Resources

The existence and significance of paleontological, historical, and ethnographic resources, as well as resources of educational, scientific, or religious significance cannot be determined until the Applicant has completed the cultural resources survey as specified in Findings 3 and 4 of the Final Report. Such survey shall be filed prior to or at the time of the filing of the AFC.

Public Health - Radionuclides

1. The Applicant shall provide detailed information on its proposed ^{222}Rn monitoring program at or prior to the filing of an AFC for Unit 17.

2. The Applicant shall provide the information necessary to support its proposed amendments to findings 9 and 12.

Structural Engineering

Applicant shall provide a designation as to which power plant and related facility components are critical at or prior to the filing of an AFC for Unit 17.

APPROVED: December 20, 1978